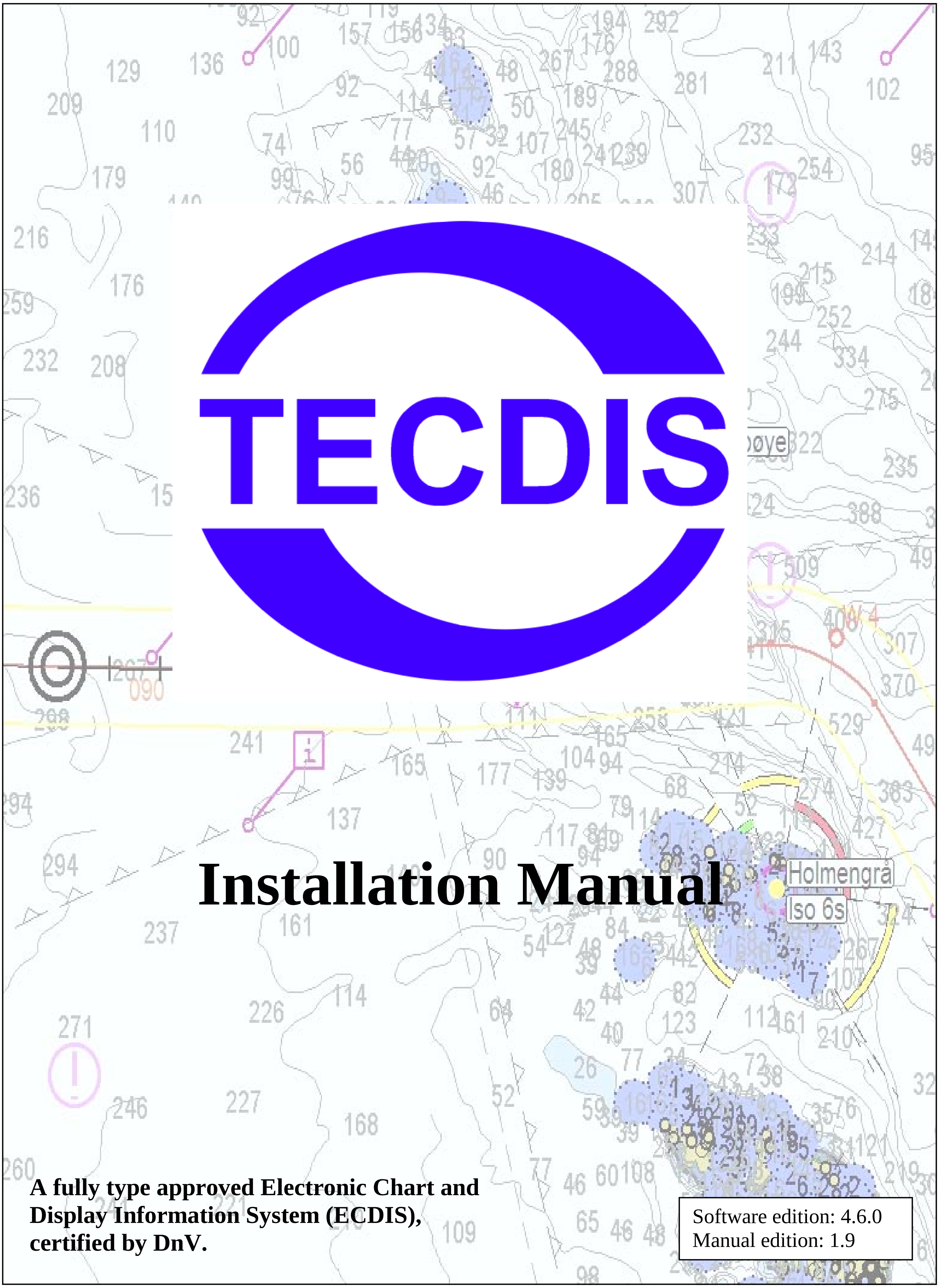


TECDIS

Installation Manual

A fully type approved Electronic Chart and Display Information System (ECDIS), certified by DnV.

Software edition: 4.6.0
Manual edition: 1.9

⚠ SAFETY INSTRUCTIONS

⚠ WARNING

Do not open the equipment unless totally familiar with electrical circuits and service manual.

ELECTRICAL SHOCK HAZARD

Only qualified personnel should work inside the equipment.

Turn off the power at the mains switch-board before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

Do not install the monitor unit, processor unit or control unit where they may get wet from rain or water splash.

Water in the units can result in fire, electrical shock, or damage the equipment.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or damage the equipment .

Use only the specified power cable.

Fire or damage to the equipment can result if a different cable is used.

⚠ WARNING

The PC Main board is equipped with a litium battery. The lithium battery should be replaced only in the factory.

There is a danger of explosion if the wrong type of battery is used for replacement.

⚠ CAUTION

Attach securely protection earth to the ship's body.

The protection earth (grounding) is required to the AC power supply to prevent electrical shock.

Observe the following compass safe distances to prevent interference to a magnetic compass:

	Standard compass	Steering compass
HT405P4 TEL-A1	2.20m	1.50m
HT403P4 TEL-A1	2.70m	1.90m
HTB04PM TEL-A1	0.75m	0.55m
JH20T06MMD-E1/E11	0.90m	0.70m
JH19T02MMD-E1/E11	0.90m	0.65m
JH23T02FUR-E11	1.25m	1.00m
JH20T04MMD-E1/E11	2.10m	1.35m
BTC5100C PS/2	0.3m	0.3m
DNH HP-6	1.5m	1.0m
DHN HPS-6	1.5m	1.0m
Furuno RCU-018	0.30m	0.30m

TABLE OF CONTENTS

General introduction to the installation manual

This manual is describing the procedure to ensure a proper and safe installation of our TECDIS onboard a vessel. Please read carefully this manual before you start up the commissioning of the TECDIS.

The installation and commissioning of the TECDIS must be performed by an authorized service engineer, which has undertaken training or in other forms gained the required skills to perform an authorized installation of an TECDIS system onboard a vessel.

To ensure a professional after-sale service and a personal track-record of TECDIS installations, we recommend that the service engineer saves the defalt setup file to floppy disk or other media. He can then keep this file in his personal register of TECDIS installations.

The file is located at: C:\Program files\TECDIS\dta4.setup, or C:\Program files\TECDIS\Telchart.ini (if present).

Please note the following:

All position inputs to TECDIS from all external sensors must be in WGS-84 datum..

TECDIS shall be supplied by UPS (uninterrupted power supply) 220VAC or emergency power, this shall include also TECDIS backup (if installed) and other hardware related to the TECDIS installation. A dedicated UPS shall be supplied to each TECDIS (if dual installation). The UPS or emergency power shall have sufficient capacity to supply all required equipment for a period of at least 60 seconds.

Checklist to verify the proper installation of the TECDIS shall be filled in and filed onboard, installer to preferably file a copy and store in his personal archive.

Equipment lists:

Standard Supply

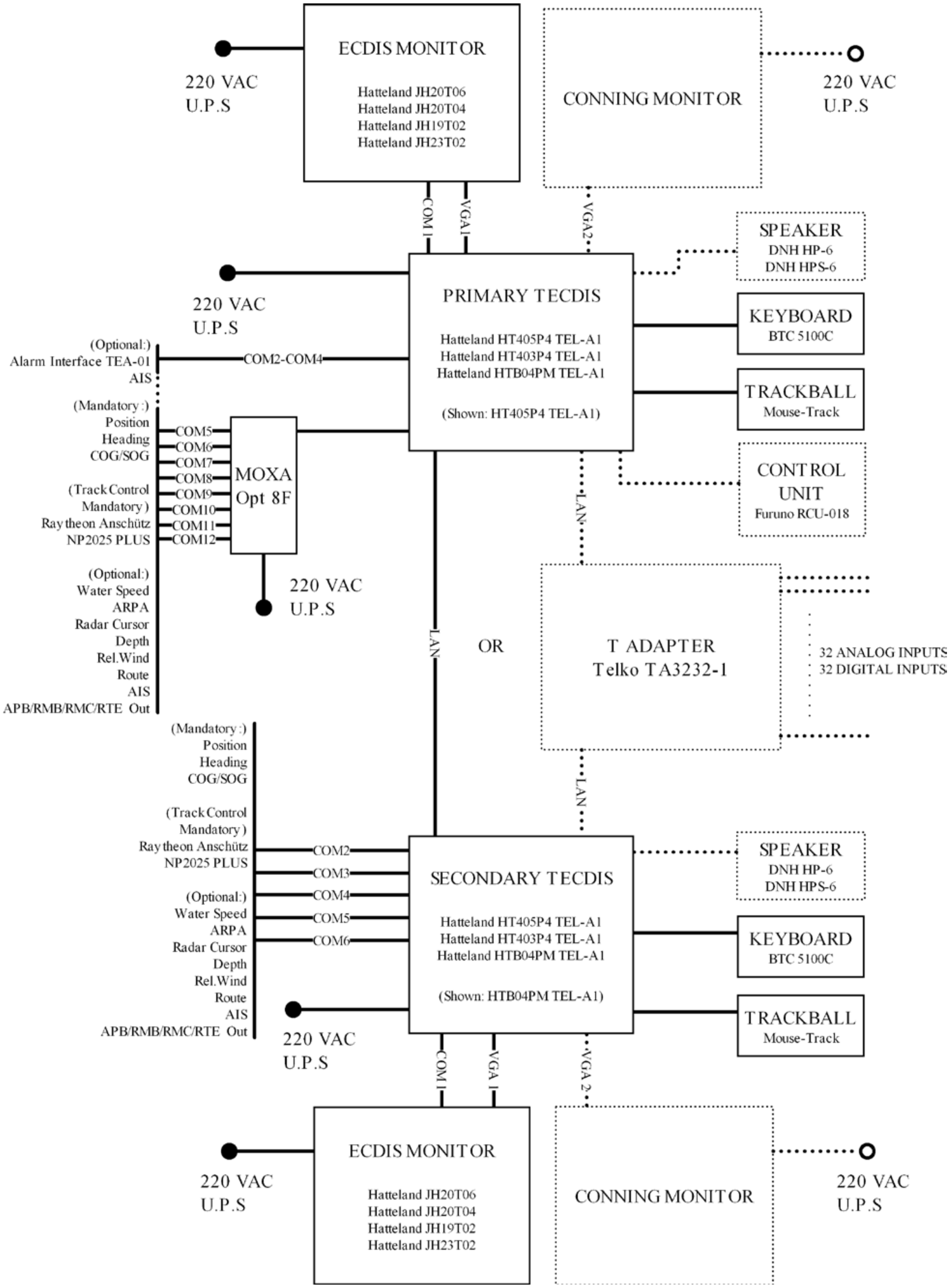
Name	Type	Qty	Remarks
Computer	HT405P4 TEL-A1	1	1,9 m power cable
Monitor	JH20T06 MMD E11	1	2,0 m video cable 1,9 m power cable
TECDIS keyboard	BTC-5100C	1	1,3 m cable
TECDIS mouse	Mouse-track	1	1,9 m cable
Serial interface RS-422	MOXA OPT8F	1	1,5 m cable

Optional Supply

Name	Type	Qty	Remarks
Computer	HTB04PM TEL-A1 (See note 1)	1	1,9 m power cable
Computer	HT403P4 TEL-A1 (See note 1)	1	1,9m power cable
Monitor	JH20T06 MMD-E1	1	2,0m video cable 1,9m power cable
Monitor	JH20T04 MMD E1 / E11 (See note 2)	1	2,0m video cable 1,9m power cable
Monitor	JH19T02 MMD E1 / E11	1	2,0m video cable 1,9m power cable
Monitor	JH23T02 FUR E11	1	2,0m video cable 1,9m power cable
Telko Alarm Interface	TEA-01	1	1,4 m cable
Bracett for monitor	JH MMD BR	1	
Audio amplifier PCI card	HT 00072 OPT-A1	1	
Speaker (bracett mount)	DNH HP-6 (See note 3)	1	0,5 m cable
Speaker (flush mount)	DNH HPS-6 (See note 3)	1	0,5 m cable
Analog signal collector	TA3232-1	1	T Adapter
Control Unit	Furuno RCU-018	1	

Note 1: HT403P4 TEL-A1 and HTB04PM TEL-A1 can only be used in combination with JH20T04 MMD E1 / E11 or JH19T02 MMD E1 / E11.
Note 2: JH20T04 MMD E1 /E11 can only be used in combination with HT403P4 TEL-A1 or HTB04PM TEL-A1
Note 3: Loudspeaker required when display unit does not contain a buzzer

Installation Overview



Specifications:

HT403P4 TEL-A1 Processor:

• 4U - 19" Rack Mount Computer
• Intel Pentium 4 - 3.0GHz (S478)
• Intelligent Preheating Circuit
• Dual Head Video Card
MATROX G450-AGP
• 512MB RAM (Max 2GB)
• 40GB 3,5” Harddrive
• DVD/CD-R/W (52x/32x/52x)
• 1,44MB 3,5” FDD SLIM
• 10/100Mpbs Ethernet LAN
• 2 x RS-232 Serial Ports
• 8 ports RS-422 serial interface MOXA
C218T-PCI with external optoisolated
interface OPT-8F
• 1 x Parallel port
• 6 x USB ports
• Standard PS/2 (keyboard & mouse)
• Dim: 427(W) x 176(H) x 480(D) mm
• 110/230V (300W)

HTB04PM TEL-A1 Processor:

• Maritime Stand-alone Computer
• Ultra Compact Form Factor
• Intel Pentium M 1.1GHz
Low Voltage,1MB L2 Cache
• 512MB RAM
• IDE HDD Automotive Removable 30GB
2,5", 4200 RPM, 2MB Buffer
• Dual Head Video Card
MATROX G450-PCI
• SLIM DVD-Rom
• 1.44 MB 3.5" SLIM Floppy Drive
• Compact Flash Reader
• 10/100Mbps + 10/100/1000Mbps
• 1 x RS-232 Serial Port
• 5 x RS-422 Serial Ports
• 1 x Parallel port
• 3 x USB
• Standard PS/2 (keyboard & mouse)
• Dim: 290(W) x 88(H) x 221(D) mm
• 110/230V (100W)

HT405P4 TEL-A1 Processor:

• 4U – 19” Rack Mount Computer
• Intel Pentium 4 – 3.4 GHz (S775)
• Dual Head Video Card
MATROX P650 PCI-E
• 1GB RAM (Max 2GB)
• 80GB 2.5” Harddrive
• DVD/CD-R/W Dual (48x/16x/6x/8x)
• 1,44MB 3,5” FDD
• 2x 10/100/1000Mbps Ethernet LAN
• 4x RS-232 Serial Ports
• 8 ports RS-422 serial interface MOXA
C218T-PCI with external optoisolated
Interface OPT-8F
• 1x Parallel Port
• 6x USB 2.0 ports
• Standard PS/2 (keyboard & mouse)
• Dim: 427 (W) x 176 (H) x 480 (D) mm
• 110/230V (400W)

Monitor JH20T04:

- 20,1 inch viewable image size
- Active matrix, Thin Film Transistor
- Max resolution: 1600x1200
- Pixel size: 0,255 mm H/V
- Response time: 15 ms
- Contrast ratio: 600:1
- Light intensity: 300 cd/m2
- Viewable angle: +- 85 deg. H/V/L/R
- Active display area: 406x306 mm H/V
- Auto detects VGA to UXGA
- Optimum picture with 60 Hz
- Input signal: DVI-D, DVI-D input 24pin
- Input signal: RGB, 15pin mini D-SUB
- Input signal: Compsite Video, RCA
- Input signal: S-Video
- AC power: 115 VAC/ 60 Hz
  230 VAC/ 50 Hz (100 W max)
- Weight: 15 kg

Monitor JH19T02:

- 19,0 inch viewable image size
- Active matrix, Thin Film Transistor
- Max resolution: 1280 x 1024
- Pixel size: 0,294 mm H/V
- Response time: 15 ms
- Contrast ratio: 700:1
- Light intensity: 300 cd/m2
- Viewable angle: +- 85 deg. H/V/L/R
- Display area: 376.32x301.056 mm H/V
- Auto detects VGA to UXGA
- Optimum picture with 60 Hz
- Input signal: DVI-D, DVI-D input 24pin
- Input signal: RGB, 15pin mini D-SUB
- Input signal: Compsite Video, RCA
- Input signal: S-Video
- AC power: 115 VAC/ 60 Hz
  230 VAC/ 50 Hz (100 W max)
- Weight: 12 kg

Monitor JH20T06:

- 20,1 inch viewable image size
- A-Si Thin Film Transistor Active matrix,
- Max resolution: 1600x1200
- Pixel size: 0,255 mm H/V
- Response time: 16 ms
- Contrast ratio: 700:1
- Light intensity: 300 cd/m2
- Viewable angle: +- 89 deg. H/V/L/R
- Active display area: 408x306 mm H/V
- Auto detects VGA to UXGA
- Optimum picture with 60 Hz
- Input signal: DVI-D, DVI-D input 24pin
- Input signal: RGB, 15pin mini D-SUB
- Input signal: Compsite Video, RCA
- Input signal: S-Video
- AC power: 115 VAC/ 60 Hz
  230 VAC/ 50 Hz (100 W max)
- Weight: 15 kg

Monitor JH23T02:

- 23,1 inch viewable image size
- Thin Film Transistor Active matrix,
- Max resolution: 1600x1200
- Pixel size: 0,294 mm H/V
- Response time: 20 ms
- Contrast ratio: 600:1
- Light intensity: 250 cd/m2
- Viewable angle: +- 85 deg. H/V/L/R
- Active display area: 440.4x352.8 mm H/V
- Auto detects VGA to UXGA
- Optimum picture with 60 Hz
- Input signal: DVI-D, DVI-D input 24pin
- Input signal: RGB, 15pin mini D-SUB
- Input signal: Compsite Video, RCA
- Input signal: S-Video
- AC power: 115 VAC/ 60 Hz
  230 VAC/ 50 Hz (100 W max)
- Weight: 17 kg

MOUSE-TRAK PS/2:

Functional Specifications:

Resolution:	192 to 576 pulses per revolution of the ball.
Input Switches:	Three (3)
Interface:	IBM PS/2
Connector:	6-Pin Mini-DIN Male
Pin Assignments:	Pin 1 = PS/2 Data Pin 2 = NC Pin 3 = Common Pin 4 = +5V Pin 5 = PS/2 clock Pin 6 = NC
Compatibility:	Microsoft PS/2 Mouse Protocol, Logitech PS/2 Mouse Protocol
Switches:	Mechanically limited, break resistant
Cable:	96”+-0.5”
Power Consumption:	Idle: 8mA Max: 12mA

Mechanical Specifications:

Dimensions:	Approximately 4”wide x 8”long
Weight:	1.3 lbs.
Body Material:	Glass filled Xenoy thermoplastic, black
Ball Material:	Cast Phenolic Resin
Ball Hardness:	Rockwell H 85
Tracking Force:	1.5 oz. maximum, 0.5 oz. typical (15g)
Ball Load:	250 lbs. maximum downward
Ball Speed:	500 RPM maximum
Hand Pad:	Injection-molded vinyl, black

Environmental Specifications:

Operating Temperature:	0 to +50 degrees Celsius
Storage Temperature:	-20 to +60 degrees Celsius
Humidity:	0 to 95% non condensing

Speaker HP-6/HPS-6:

Material/Colour	Polyamide UL94 V0 / RAL 7035
Mounting	Bracket
Termination	Cable,0,5m
Weight	0.5 kg
IP-rating (UL Equivalent)	(-) 67
Max. / min. amb. Temp	90°C / -40 °C
Rated / max. power	6W / 15W
SPL 1W/1m	101 db
SPL rated power	108 db
Effective freq. range	500 – 7500 Hz
Dispersion (-6dB) 1kHz / 4kHz	170° / 70°
Directivity factor, Q	4,3

Telchart Alarm interface, TEA-01:

Outputs: (connector 1,2,3,4)
are a solid state relay LCA110E which has capabilities of max 50VDC, max 200mA.
Input: (connector 5,6)
uses a current limited (6.8 Kohm resistor) opto coupler MCT5211. Reset in at 10-30 VDC.
All input and outputs are electrically isolated.
Shield shall be connected at alarm central side.
Shield are connected in Dsubmin 9f. connector,
but are not cross connected in the interface box.
A 1.5 m Cable with Dsubmin 9p female (PC-serial port) in one end and an interface box with 7 screw terminal in the other end.

Wiring info:
(1)> Alarm Out - (NO)
(2)> Alarm Out + (NO)
(3)> Sound Alarm out reset - (NO)
(4)> Sound Alarm out reset + (NO)
(5)< Sound Alarm inp. Reset – (NO)
(6)< Sound Alarm inp. Reset + (NO)
(7)- Cable shield

TELChart TA3232-1 analog adapter.

Technical specifications:

Inputs:

32 digital inputs
32 analog input (24 x +/- 10VDC and 8 x 4-20mA)

Outputs:

RS422 output ar baudrate 4800,n,8,1 to Furuno VDR
Ethernet TCP/IP serverport at 192.168.0.60 : 2000
Ethernet UDP/IP broadcast at 0.0.0.0 : 2100

The placement of the modules in the box are.

		[ADAM4051 #2]	[ADAM4017+ #4]	[ADAM4017+ #6]
[ADAM6520]	[ADAM6500]	[ADAM4051 #1]	[ADAM4017+ #3]	[ADAM4017+ #5]

From left to right as indicated in the picture
ADADM 6520 5 port industrial 10/100 Mb □thernet switch w/auto direction sense.
ADADM 6500 WinCE processor
2 x ADADM 4051 á 8 x digital inputs
2 x ADADM 4017+ á 8 x analog inputs
2 x ADADM 4017+ á 8 x analog inputs (top one is 8 x 4-20mA inputs)

Powered from 12-30 VDC
Typical consumption 0.4A @24 VDC
Fuses: 2 x 1,6AT



Chapter 1: Mounting

1.1 Monitor Unit

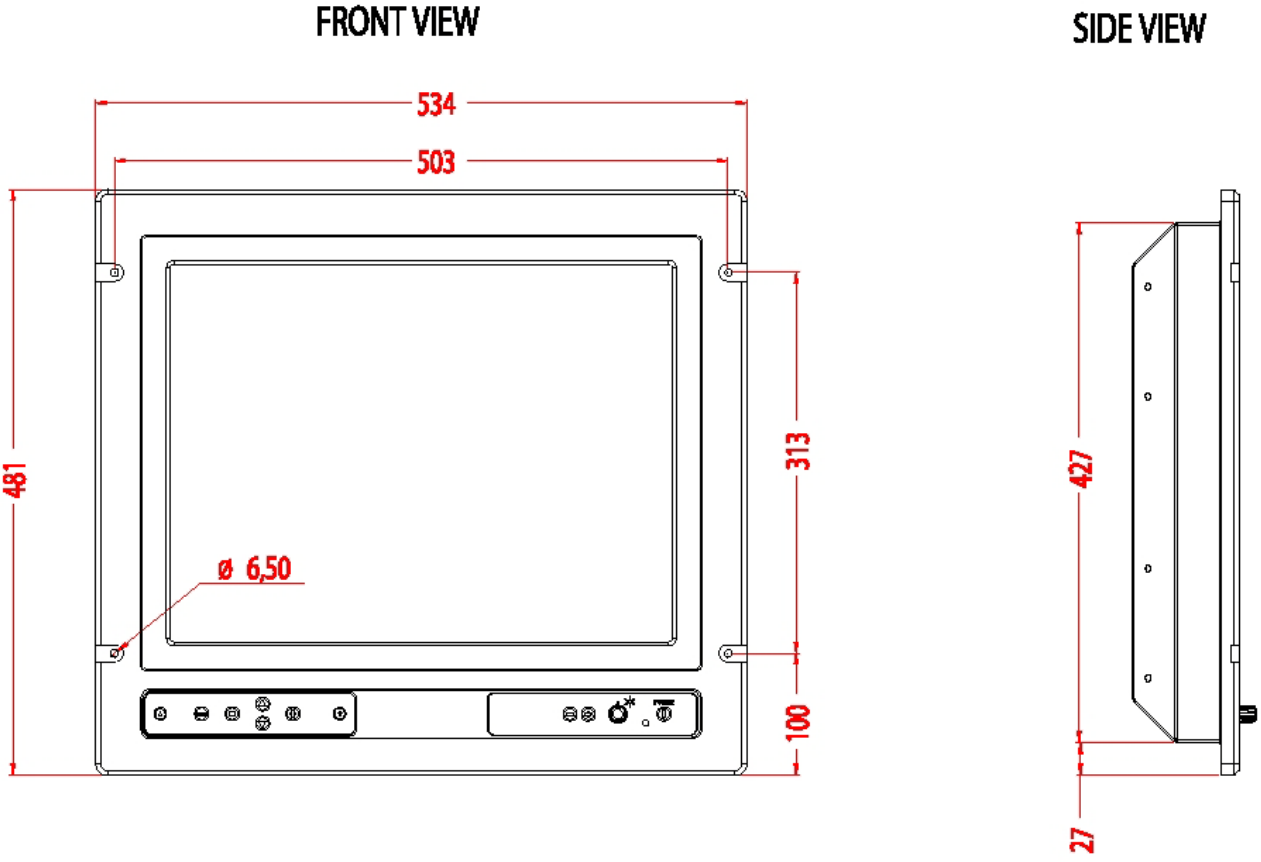
The monitor unit can be flush mounted in a console panel, or mounted on a desktop using optional accessories.

When selecting a mounting location, keep in mind the following points:

1. Select a location where the display unit can be viewed conveniently and where the screen can be viewed while facing towards the bow.
2. Select a location where vibrations are down to a minimum, try to avoid vibrations by adding strength to console where monitor is about to be installed.
3. Locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the cabinet.
4. Locate the equipment away from places subject to water splash and rain.
5. Leave sufficient space on the sides and rear of the unit to facilitate maintenance.
6. A magnetic compass will be affected if the monitor unit is placed too close to the magnetic compass. Observe the compass safe distances to prevent deviation of a magnetic compass.
7. An optional monitor bracket can be supplied for tabletop installations.

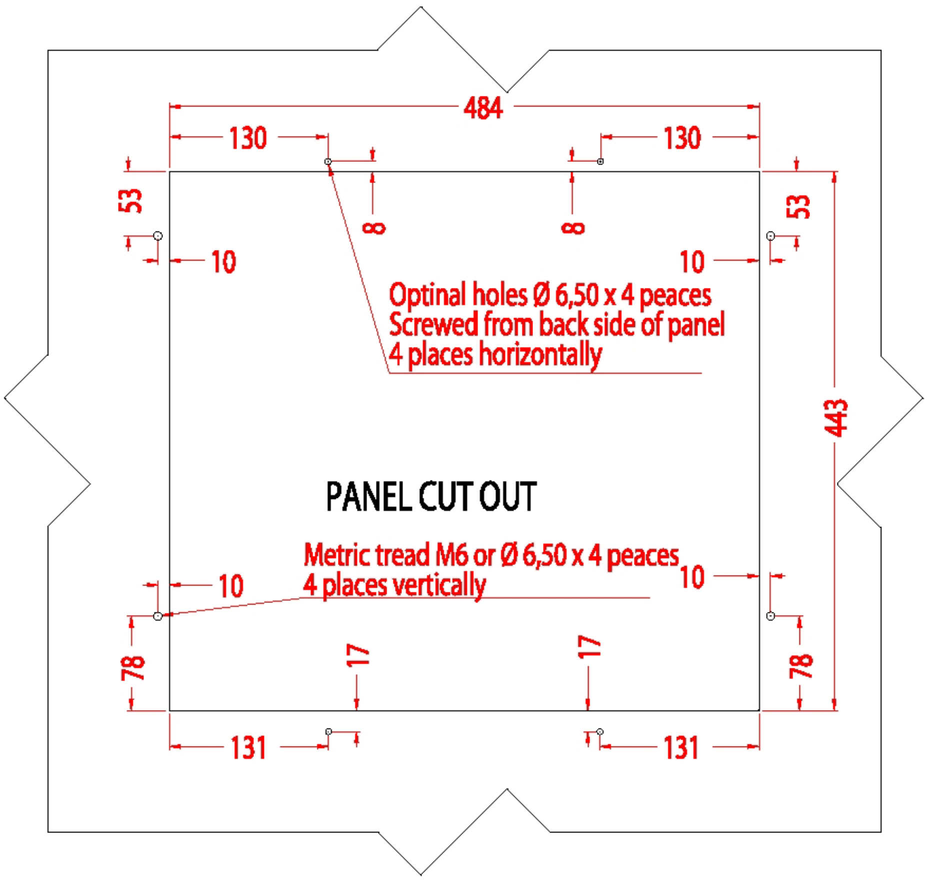
Screws for mounting the monitor to the console are supplied. When bracket is used screws for attaching bracket and monitor together is supplied. Screws for mounting bracket to table is not supplied.

Outline dimensions for JH20T04 and JH20T06:

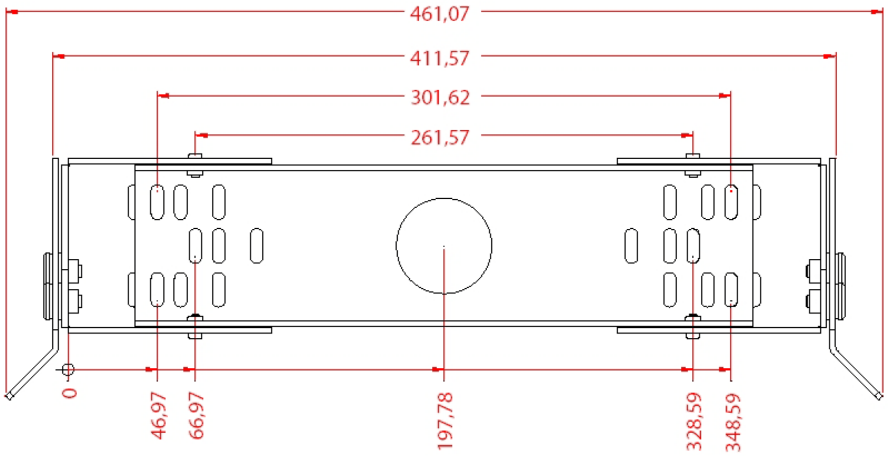


Cutout dimensions for JH20T04 and JH20T06:

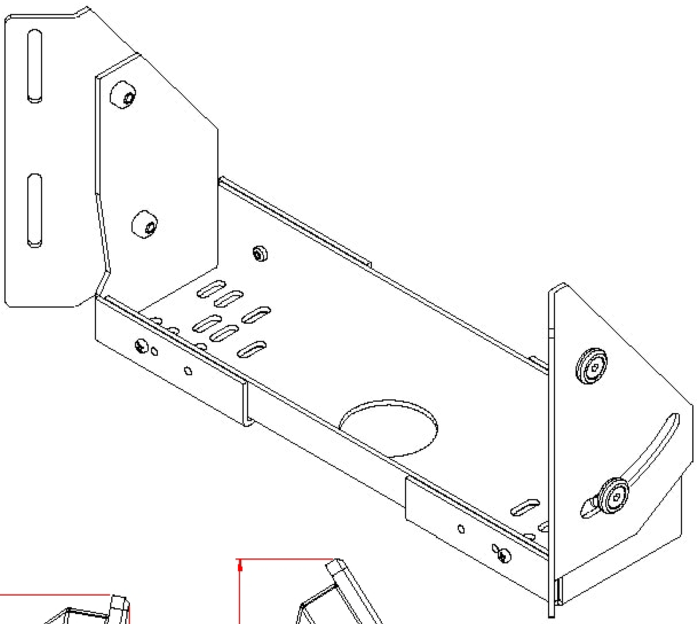
All figures in mm.

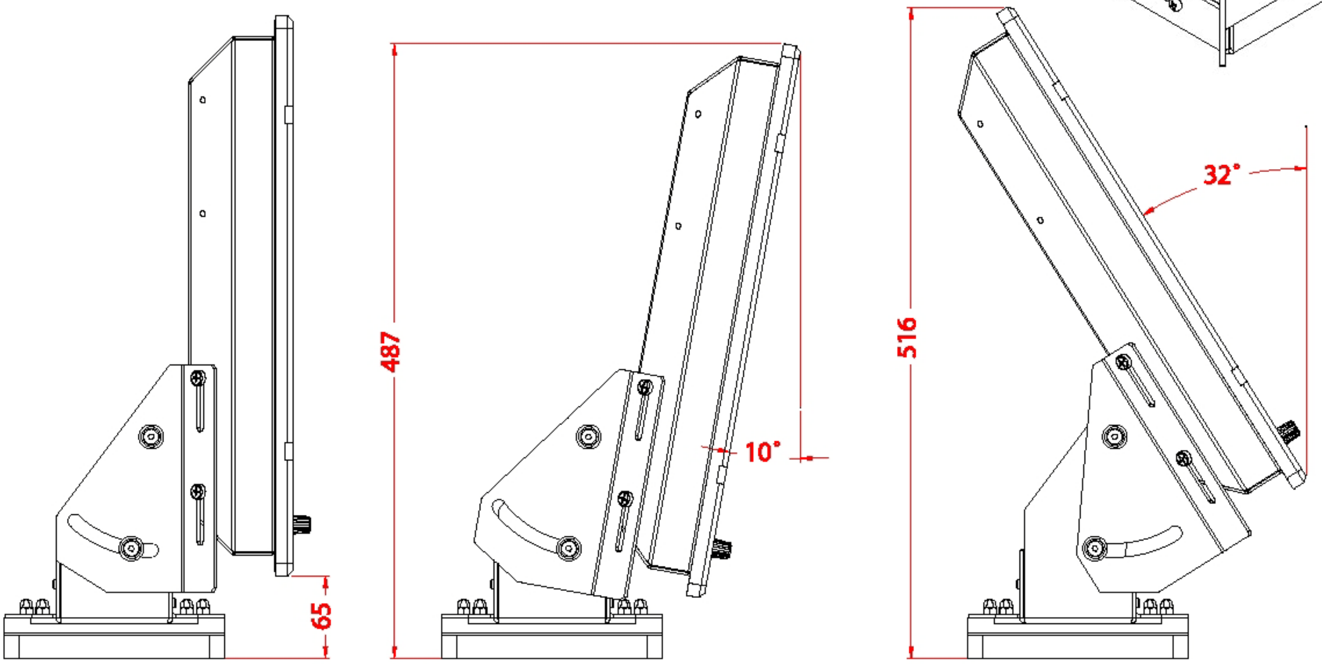


Mounting of JH20T04 and JH20T06 with bracket:

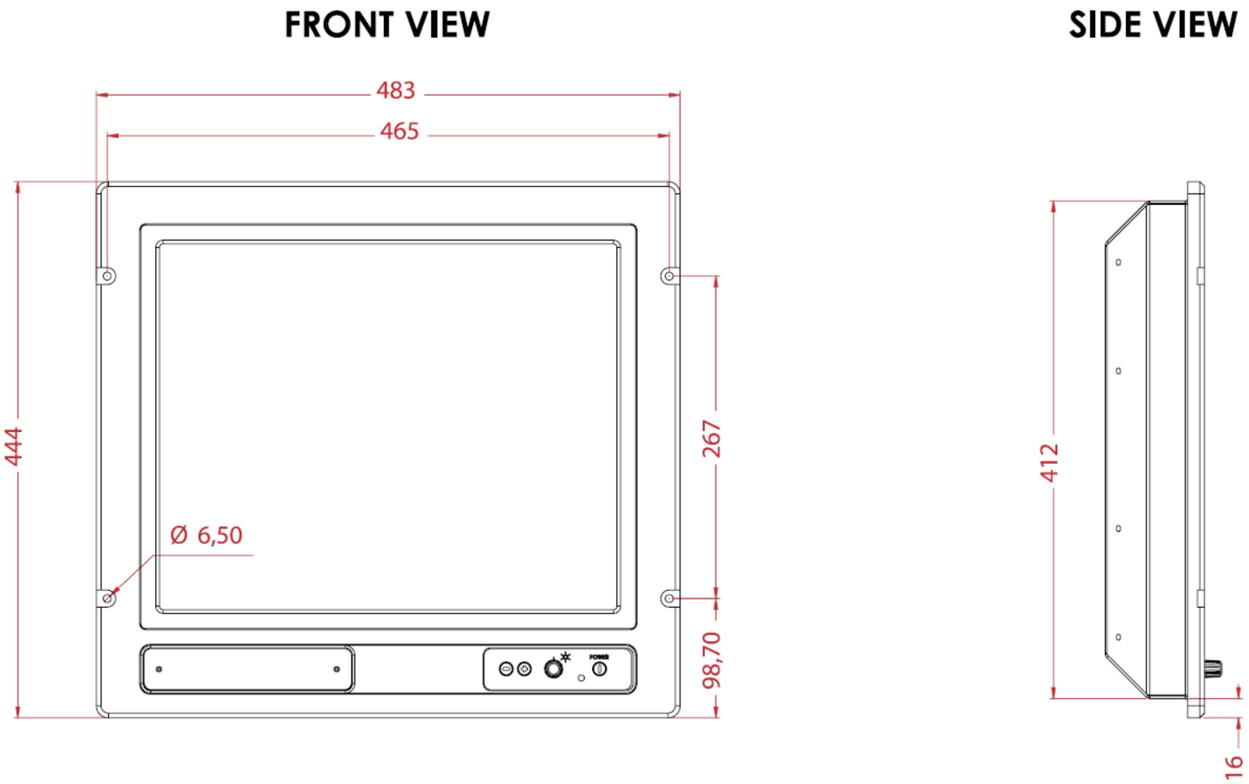


All figures in mm.

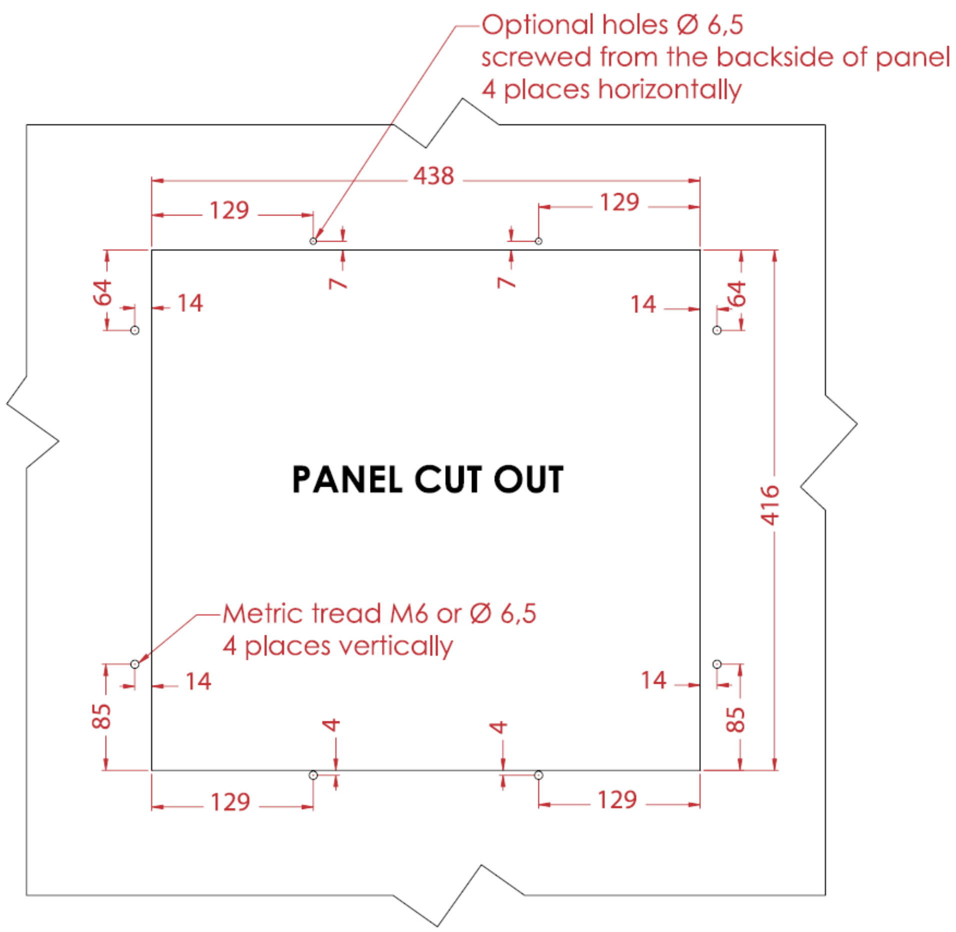




Outline dimensions for JH19T02:

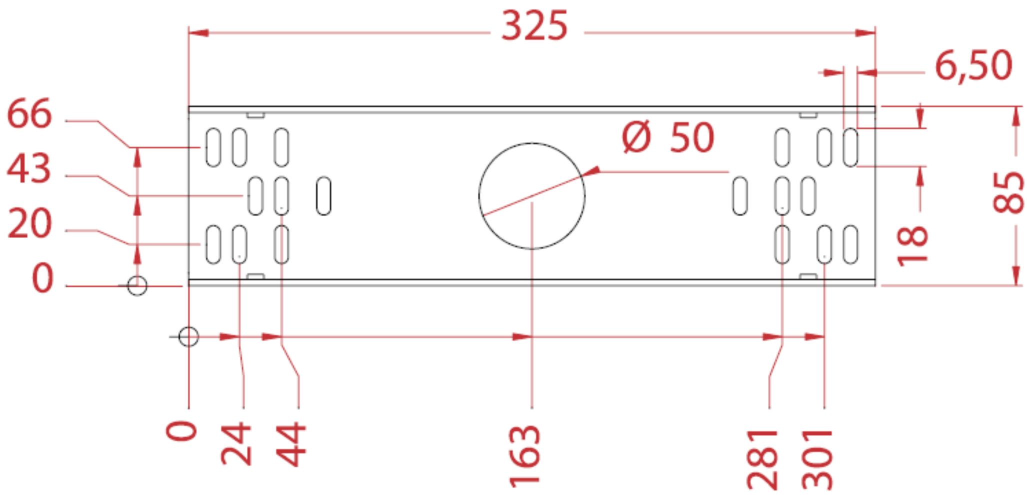


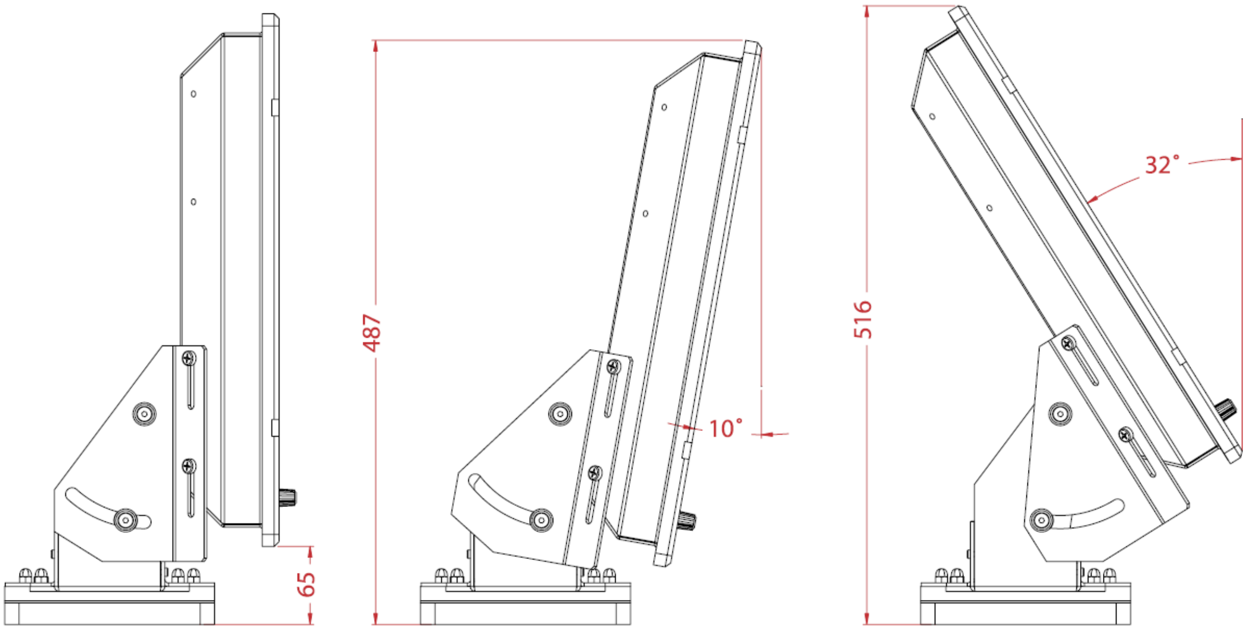
Cutout dimensions for JH19T02:



All figures in mm

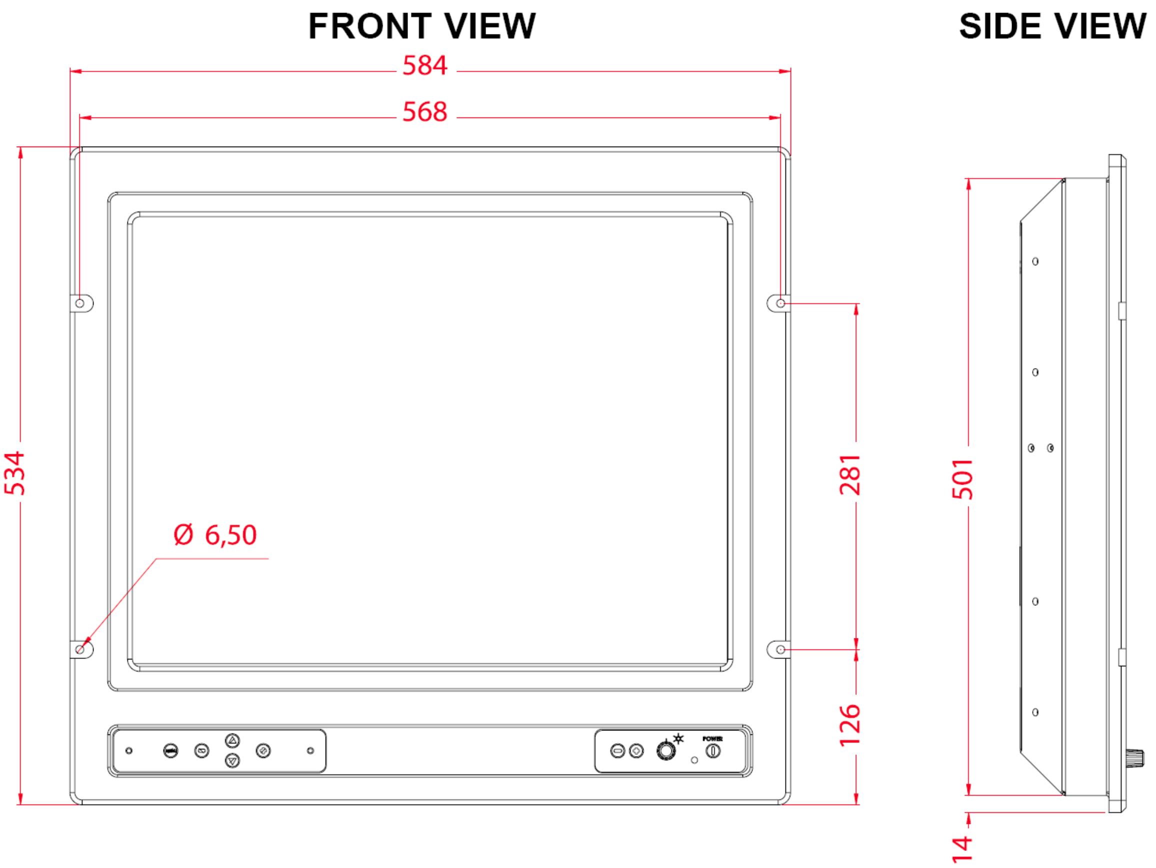
Mounting of JH19T02 with bracket:



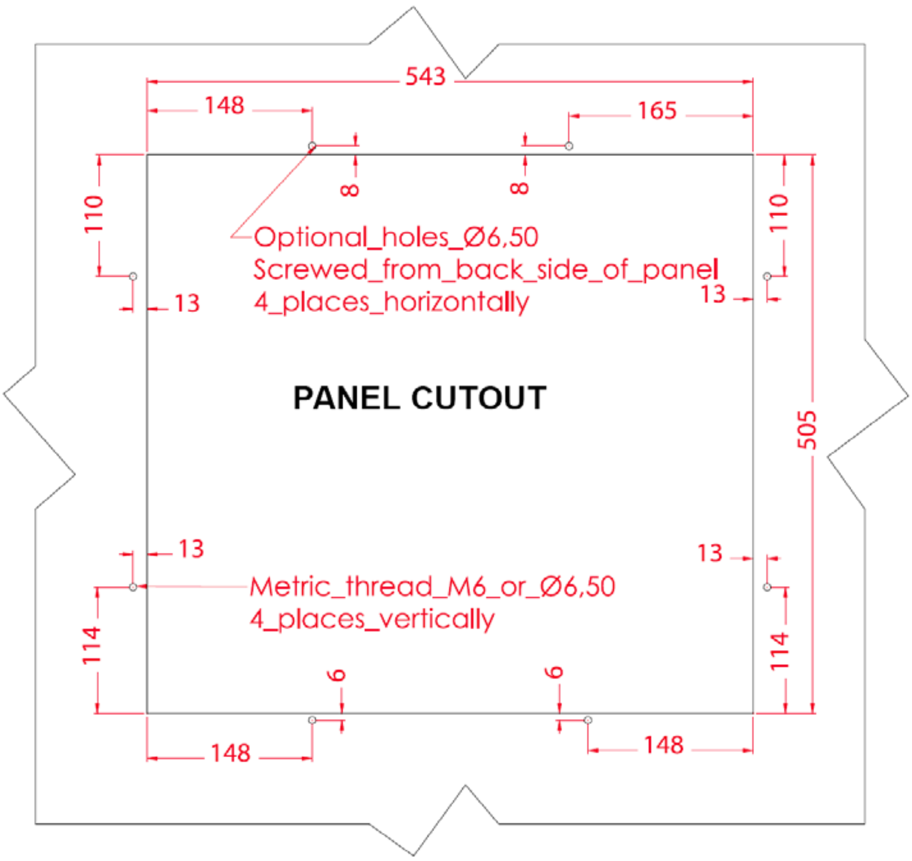


All figures in mm.

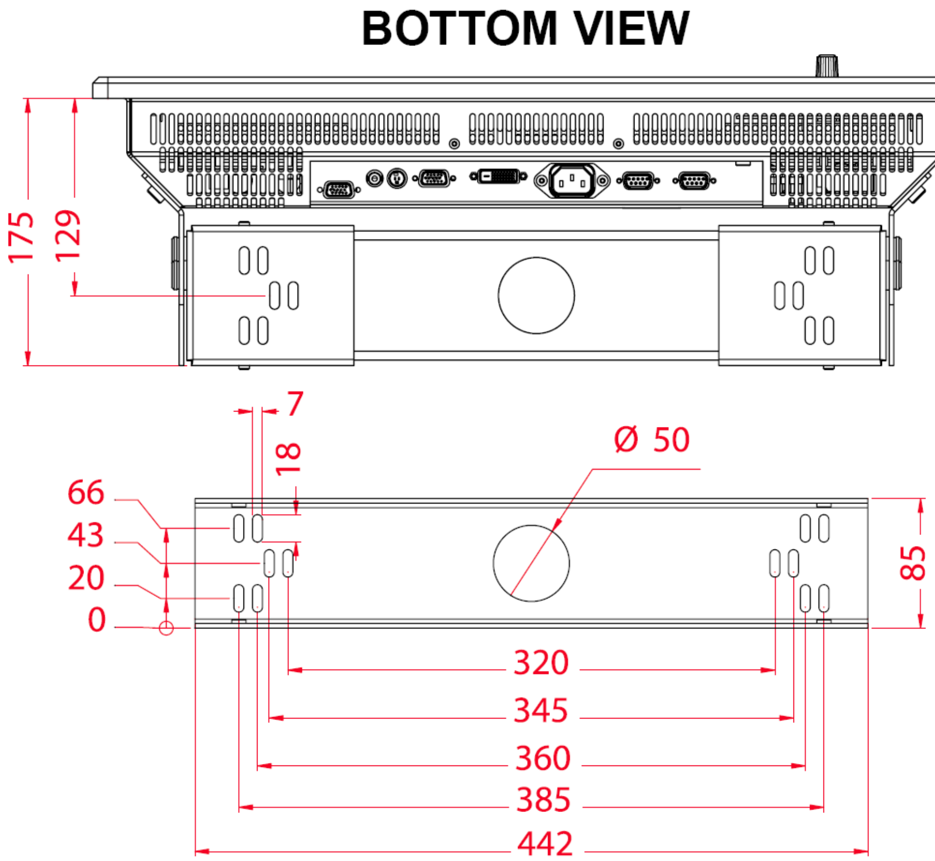
Outline dimensions for JH 23T02:

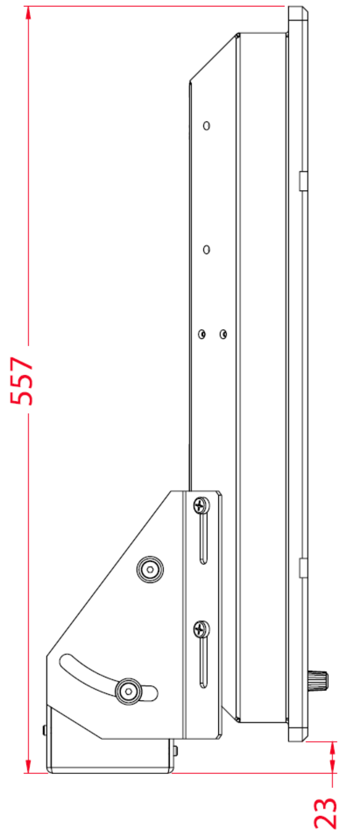


Cutout dimensions for JH23T02:



Mounting of JH23T02 with bracket:





1.2 Processor Unit

The processor unit can be mounted inside on bridge console or other suitable space on the bridge.

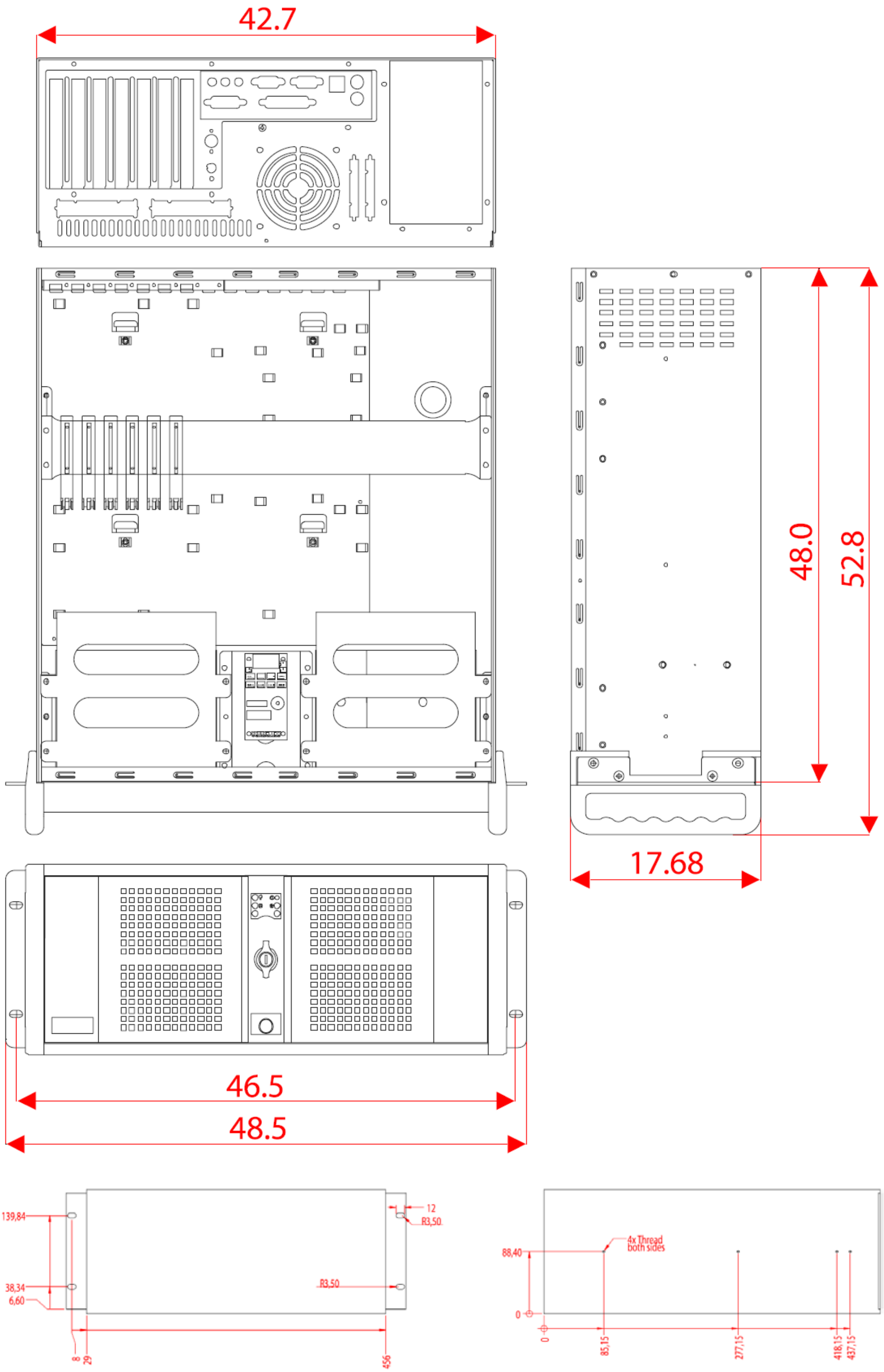
When selecting a mounting location, keep in mind the following points:

1. Select a location where vibrations are down to a minimum, try to avoid vibrations by adding strength to console where the processor is about to be installed.
2. Locate the unit away from heat sources because of heat that can build up inside the cabinet.
3. Locate the equipment away from places subject to water splash and rain.
4. Leave sufficient space on the sides and rear of the unit to facilitate maintenance and interconnection cabling.
5. **Navigator shall update charts in the processor weekly. Mount the processor at a location that enables the navigator easy access to front doors of the processor. It must be possible to open CD drawer of processor without obstructions.**
6. **The power switch shall be easily to access, front of processor may be flush mounted in the console to enable access or other means to be provided for easy access.**
7. Service key dongle must be possible to remove and insert to enable service technician to enter service mode.
8. MOXA 8-port RS-422 connection box to be arranged close to processor to enable easy interconnection. MOXA is supplied with 1,5 m interface cable between processor and connection box.

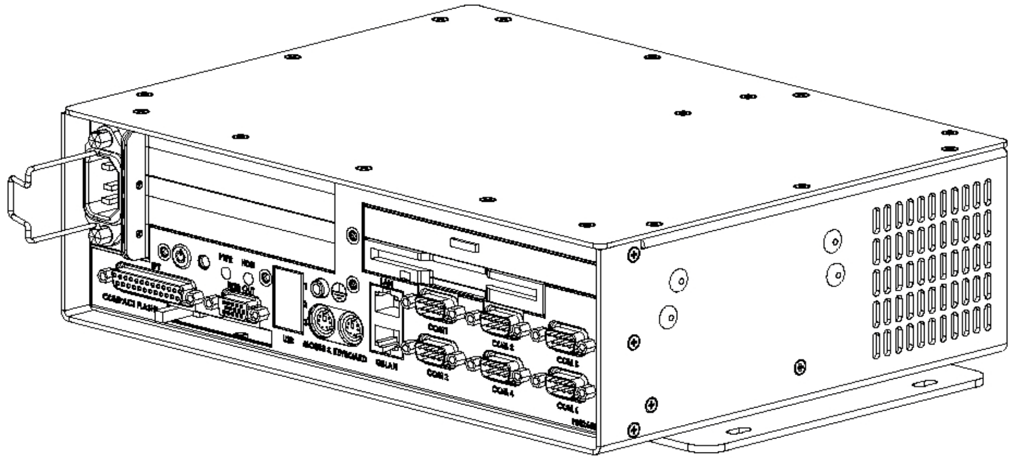
Do not protrude the housing with screws to fasten the processor. Straps should be used to fasten the processor at its location, without protruding the housing. Straps are not supplied and must be arranged locally. Check that front doors of processor can easily be opened and that cables can easily arranged in the back of the processor.

The processor is suitable for rack-mounting, 19” width rack. Height is 4U.

Outline dimensions for HT403P4 and HT405P4: All figures in mm.

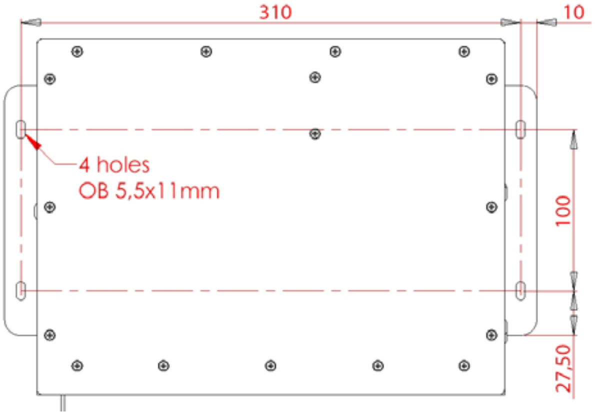


Outline dimensions for HTB04PM TEL-A1:

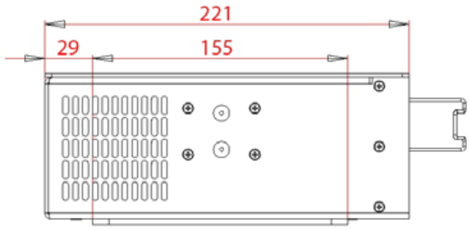


ISOMETRIC VIEW

TOP VIEW

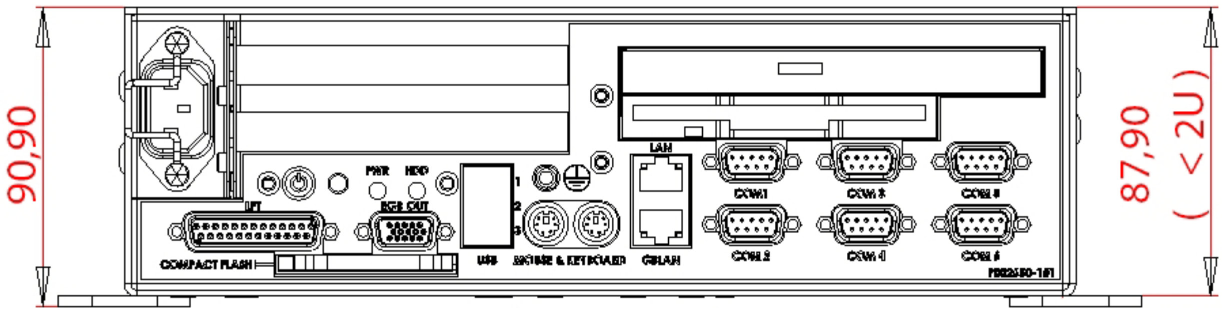


SIDE VIEW



All figures in mm.

FRONT VIEW



1.3 Control Unit Furuno RCU-018

The control unit may be mounted on a desktop, with or without the KB fixing metal (supplied), which mounts the control unit at an angle.

Mounting considerations

When selecting a mounting location, keep in mind the following points:
• Select a location where the control unit can be operated conveniently.
• Locate the unit away from heat sources because of heat that can build up inside the cabinet.
• Locate the equipment away from places subject to water splash and rain.
• Determine the mounting location considering the length of the signal cable between the control unit and the processor unit.
• A magnetic compass will be affected if the control unit is placed too close to the magnetic compass. Observe the compass safe distances specified at the start of this manual to prevent deviation of a magnetic compass.

Fixing with KB fixing plate

1. Fix the KB fixing plate to the bottom of the control unit.
2. Attach three cushions to the bottom of the control unit.
3. Fix it to a desired location with self-tapping screws (local supply).

Fixing without KB fixing metal

1. Drill four mounting holes of 5 mm diameter referring to the outline drawing.
2. Fix the control unit with four screws (M4) from under side of the desktop. (The M4 screws with a sufficient length for the thickness of the desktop should be provided locally.)

Flush mounting

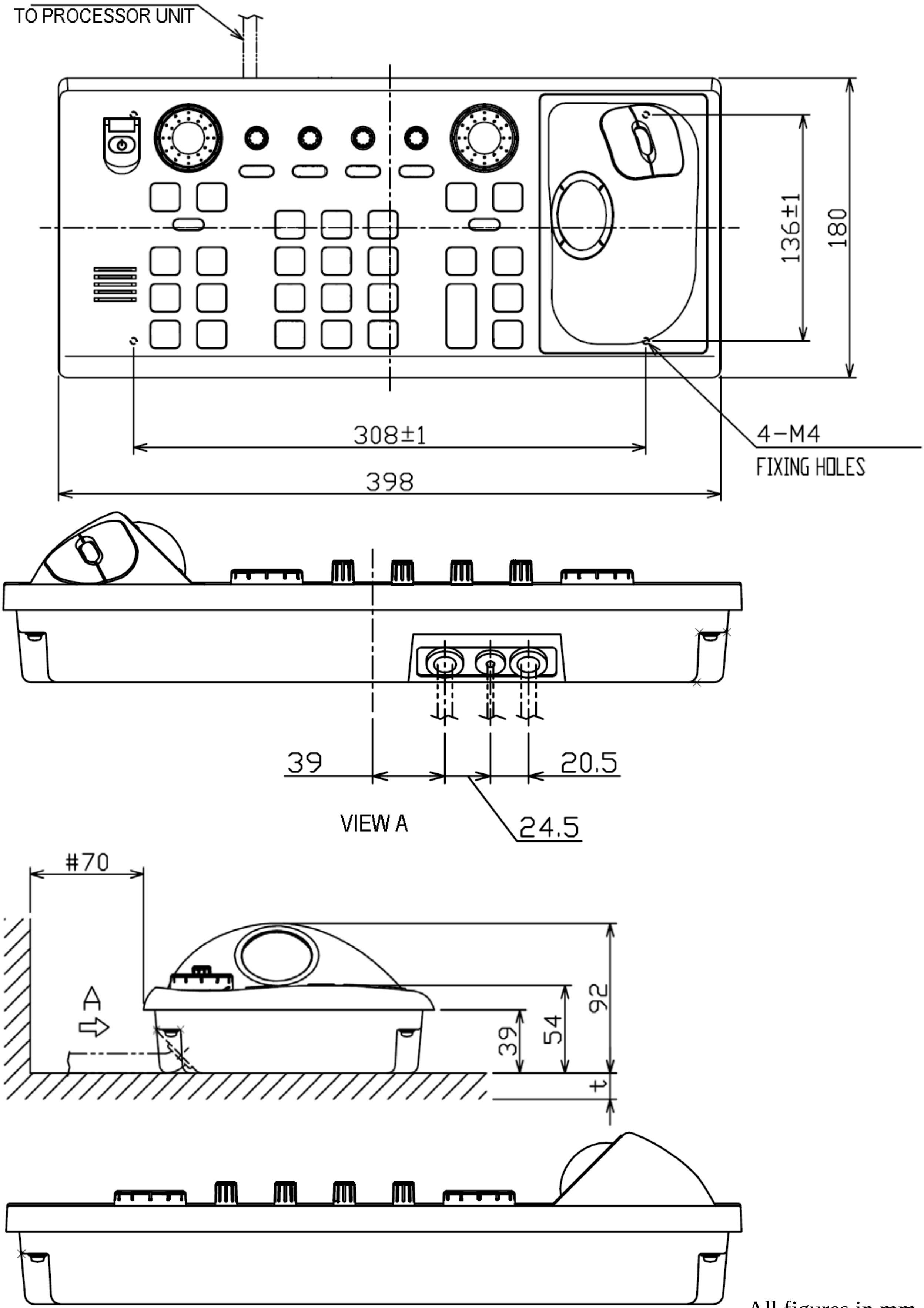
Use the optional flush mount kit Furuno FP03-09870 to mount the control unit to a console panel.

Name: Flush mount kit
Type: Furuno FP03-09870
Code No.: 008-535-630

No.	Name	Type	Qty
1	Mount plate	03-163-7531	4
2	Hex bolt	M4	4
3	Wing screw	M4X30	4

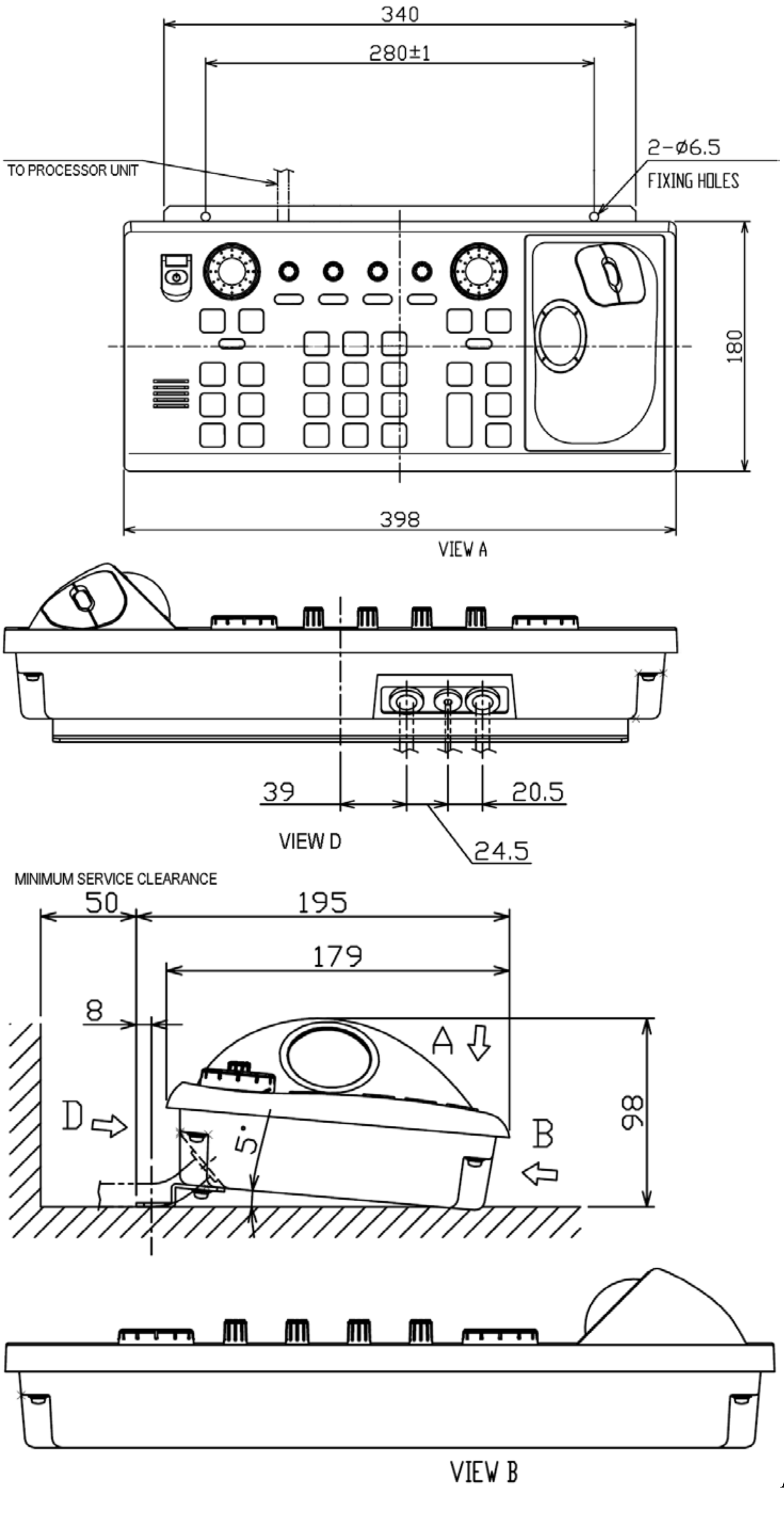
1. Prepare a cutout in the mounting location as shown in the outline figures.
2. Set the control unit to the cutout.
3. Attach the mounting plate to the control unit with four screws from the rear side.
4. Screw the wing screw to each mounting plate and then insert hex bolt to each wing screw.
5. Fasten each wing screw and then fasten the hex nuts as shown in the outline figures.

Furuno RCU-018 Control Unit outline (Desktop mount)



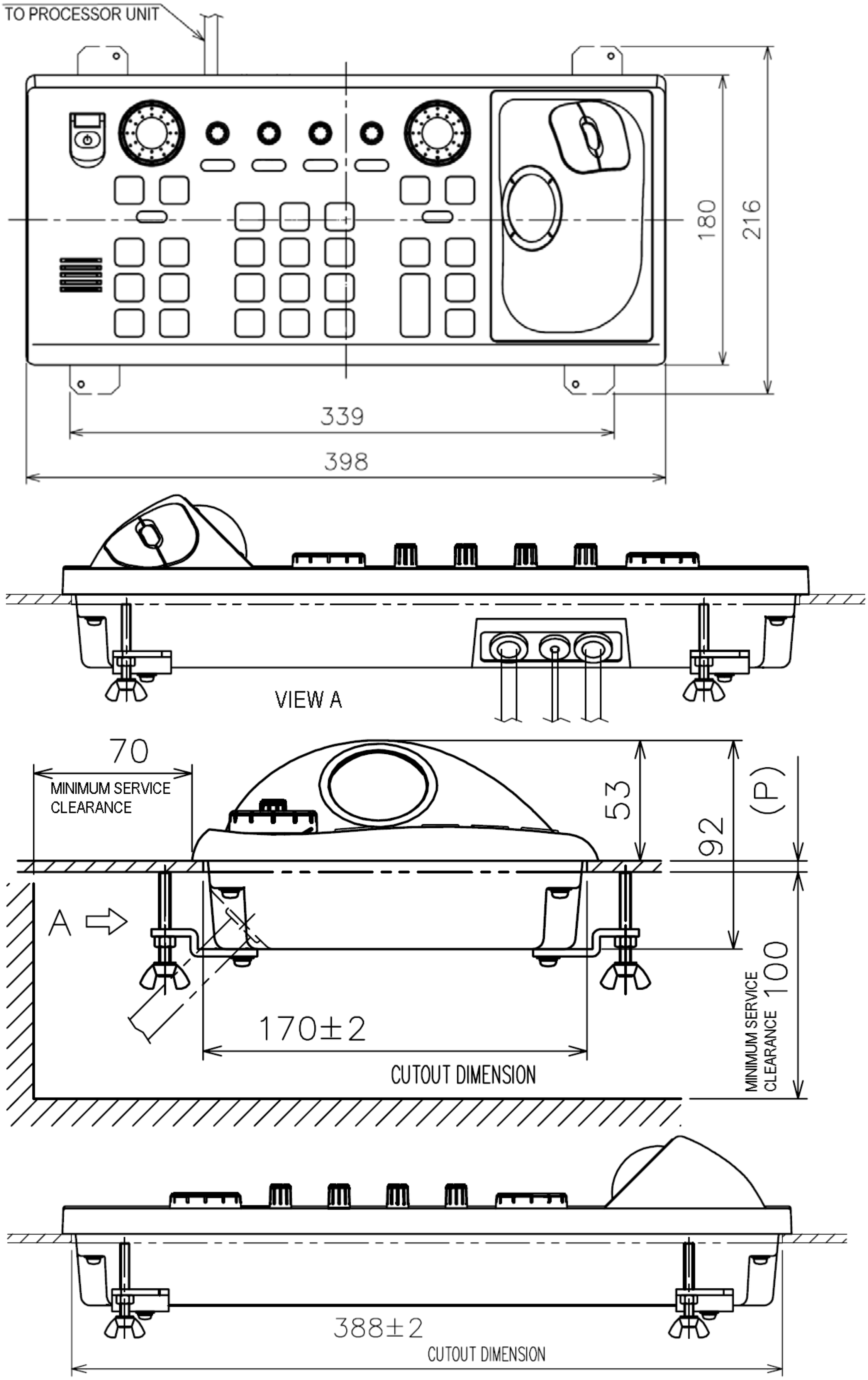
All figures in mm.

Furuno RCU-018 Control Unit outline (Desktop mount with bracket)



All figures in mm

Furuno RCU-018 Control Unit outline (Flush mount)



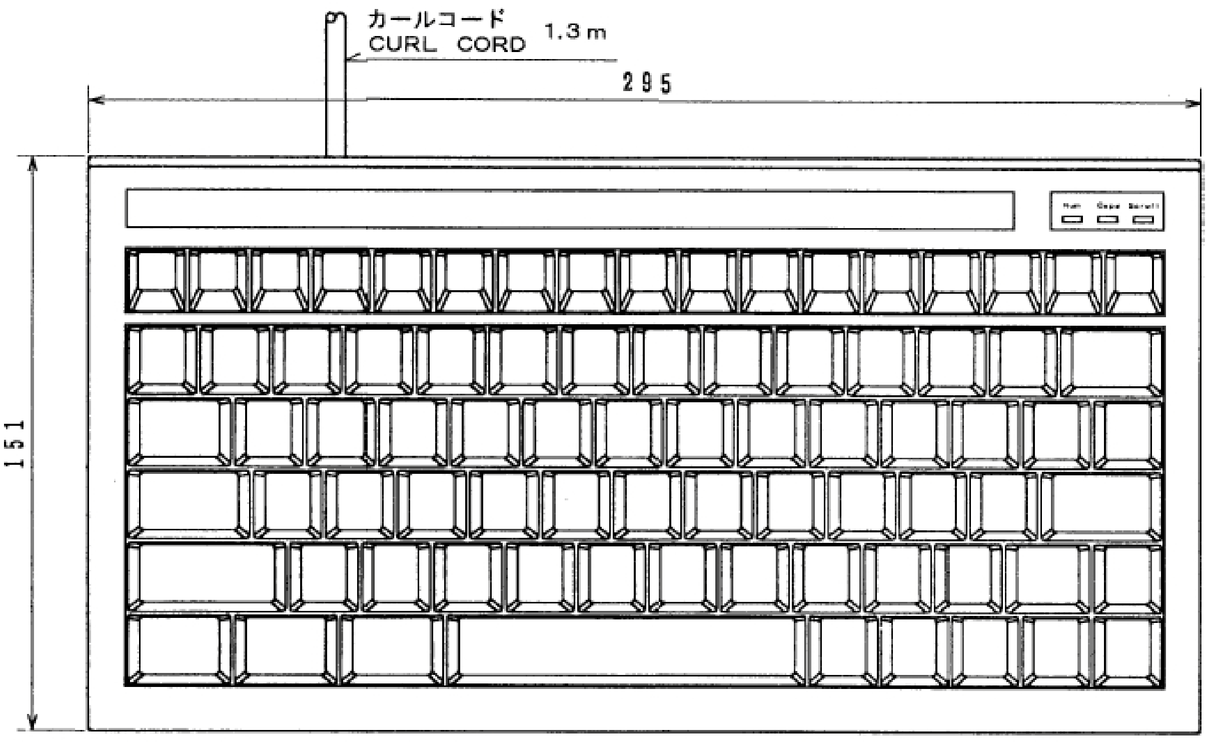
1.4 Keyboard and trackball

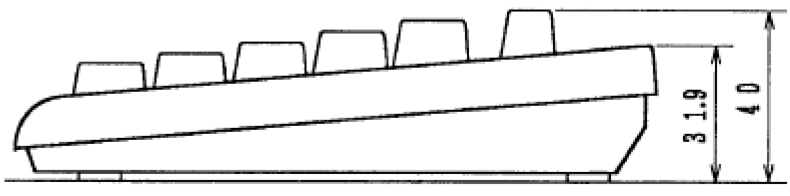
Keyboard and trackball must be monted close together, such that both can be operated simultaneously by one person.

When selecting a mounting location, keep in mind the following points:

1. Select a location where the control unit can be operated conveniently.
2. Locate the unit away from heat sources because of heat that can build up inside the cabinet.
3. Locate the equipment away from places subject to water splash and rain.
4. Determine the mounting location considering the length of the signal cable between the keyboard unit and the processor unit. (The length of the signal cable is 1,3 m).
5. Determine the mounting location considering the length of the signal cable between the trackball unit and the processor unit. (The length of the signal cable is 1,9 m).

Outline dimensions for BTC-5100C PS/2:





All dimensions in mm.

Outline dimensions for Trackball:



1.5 Additional units

When mounting additional units such as, loudspeaker, analogue alarm units, MOXA interface and other peripheral equipment, general considerations should be taken to ensure proper functions of respective equipment.

When selecting a mounting location, keep in mind the following points:

1. Select a location where vibrations are down to a minimum, try to avoid vibrations by adding strength to console where the processor is about to be installed.
2. Locate the unit away from heat sources because of heat that can build up inside the cabinet.
3. Locate the equipment away from places subject to water splash and rain.
4. Leave sufficient space on the sides and rear of the unit to facilitate maintenance and interconnection cabling.
5. Mount the loudspeaker such that audible sound level is not seriously degraded.

Do not protrude the housing with screws to fasten the units. Straps should be used to fasten the units at its location, without protruding the housing. Straps are not supplied and must be arranged locally.

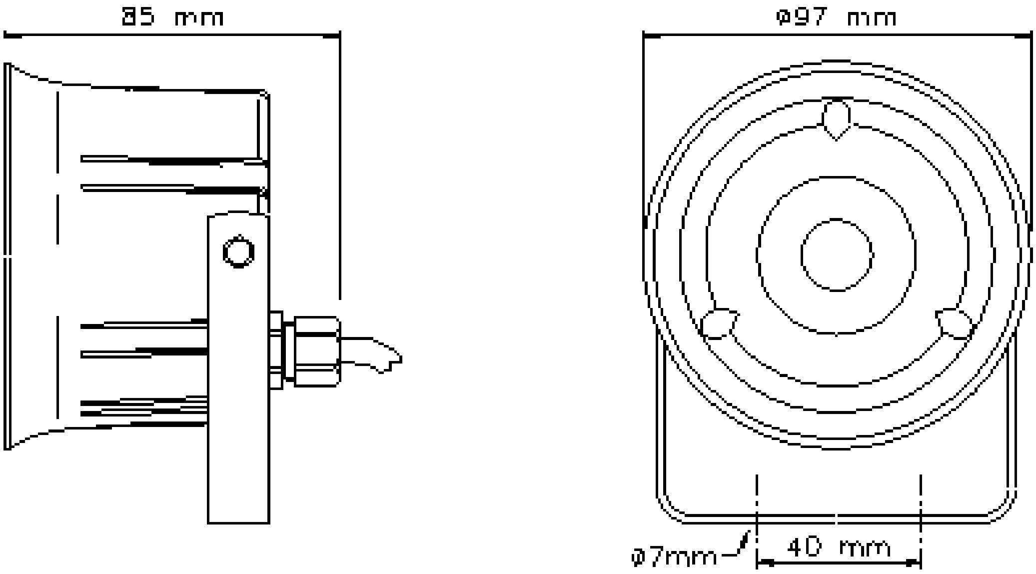
Outline dimensions for alarm interface TEA-01:



Length: 125 mm
Width: 55 mm
Heigth: 40 mm

Cable length: 1400 mm

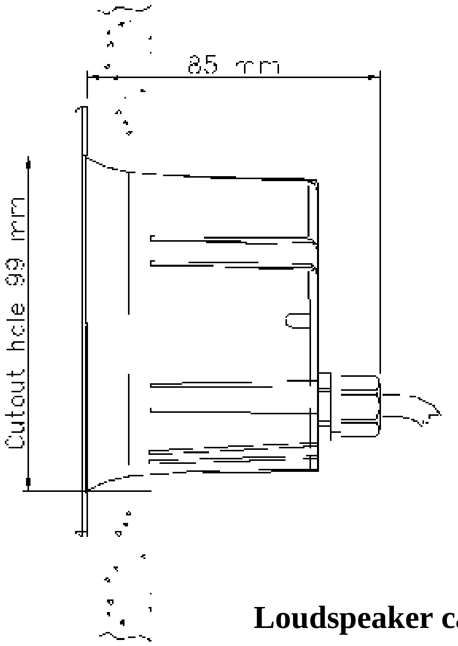
Outline dimensions for loudspeaker DNH HP6, with bracett:

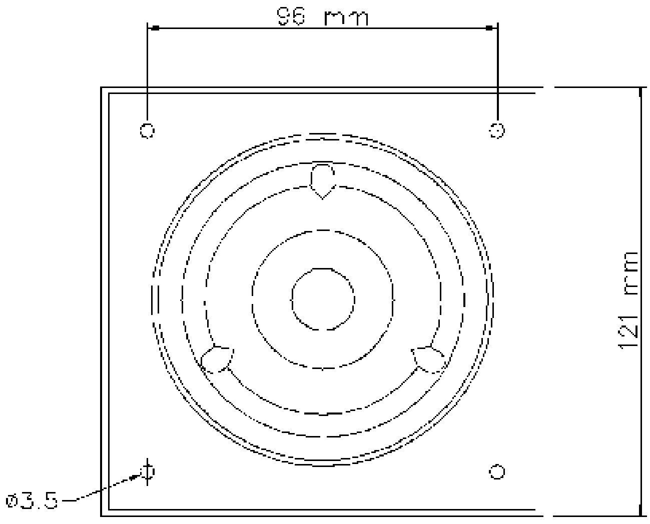


Loudspeaker cable length is 500 mm.



Outline dimensions for loudspeaker DNH HPS6, for flush mount:





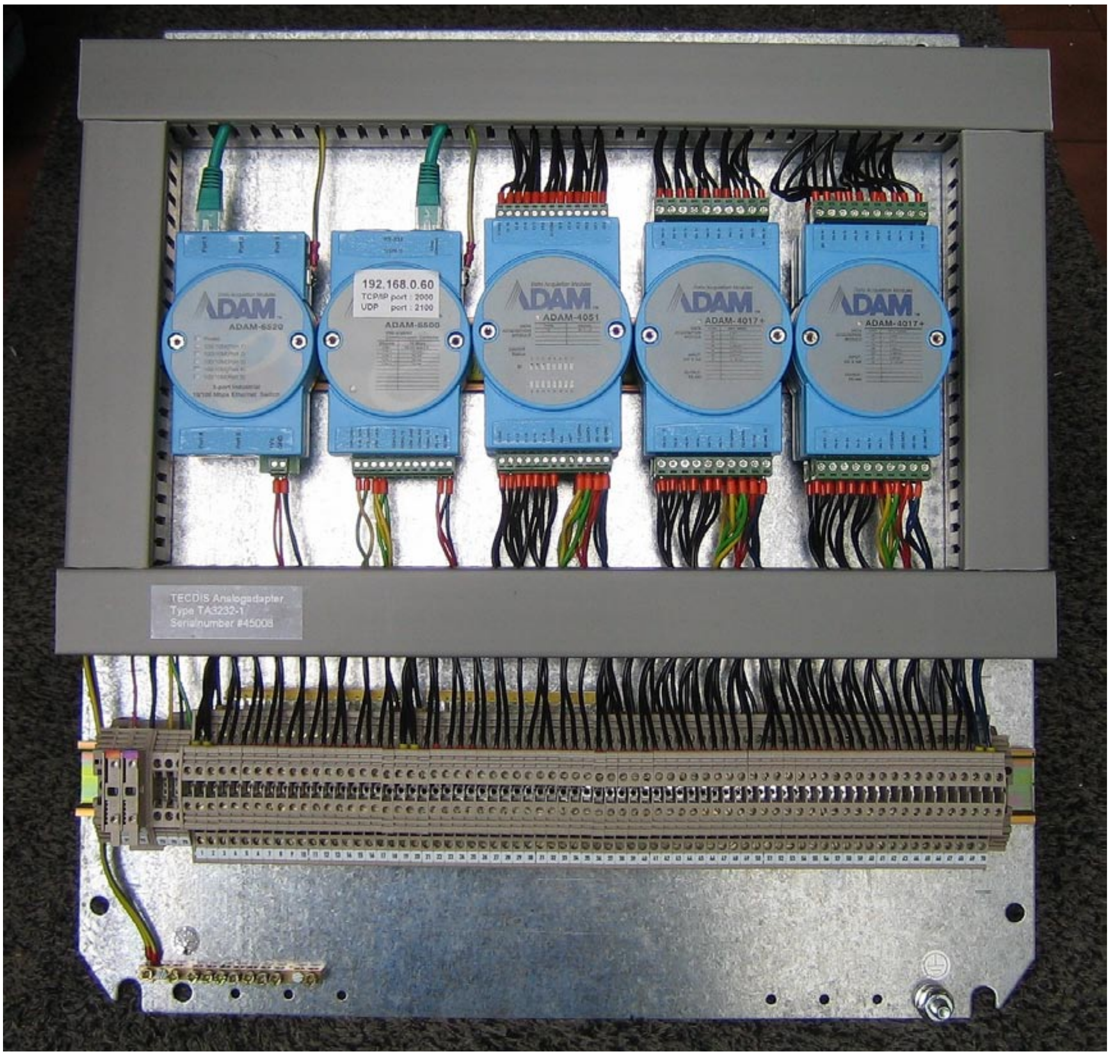
Loudspeaker cable length is 500 mm.



Outline dimensions for analog interface connection/distribution box, TA3232-1:



Length: 500 mm
Width: 500 mm
Heigth: 210 mm



Outline dimensions for MOXA RS-422 interface box, MOXA OPT8F:



Dimensions for box: 247 x 108 x 35 mm
DB-62 cable length: 1500 mm

1.6 Track Control: Anschütz NP 2025 PLUS

Refer to Anschütz NP 2025 PLUS installation manual for installation of the autopilot. All applicable procedures and guidelines are to be followed.

For valid installation and operation of Track Control functionality, TECDIS must be as a minimum be connected to the following:

- **Two Independent position sensors**
- **Two Independent heading sensors**
- **Speed sensor**
- **Alarm System for transfer of back-up navigator alarm**

TECDIS and the NP 2025 PLUS must be supplied with the same set of heading and log sensor inputs.

On vessels where the steering system does not provide a "freeze rudder function" and maintained voltage is required for maintaining rudder angle, provisions must be made on installation of Anschütz NP 2025 PLUS to maintain steering voltage output on power loss to the NP 2025 PLUS.

Location of change over controls

The steering mode selector switch or override facility, if installed, shall be located at or in the immediate vicinity of the main conning position.

Connection to TECDIS

The serial transfer module (NB05-343) on the Anschütz NP 2025 PLUS must be connected to a TECDIS serial port and configured in TECDIS SETUP (See chapter 3.6).

1.7 NAUT AW: Gyro Sensor Input Requirements

For vessels with class notation NAUT AW, the gyro sensor input to TECDIS AW must satisfy the following requirements:

1. The GAS must be supplied with a redundant gyro system including:
   - 1.1. Heading monitoring function
   - 1.2. Automatic correction for speed and latitude error
   - 1.3. Automatic switching to back-up gyro when selected gyro fails
   - 1.4. Compliance with requirements to gyro system information, “system in use” as stated in DNV rules Pt.6 Ch.8 Sec.6 H 600
     - 1.4.1. Scope of paragraph 1.4 is to enable conning system to display which gyro is presently in use.

2. All equipment with gyro input must be supplied by the same gyro at any given time to ensure a common reference point regarding heading information.

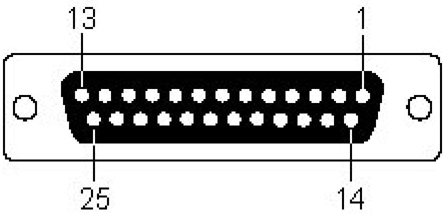
Chapter 2: Wiring and signal distribution

On the following pages wiring and signal distribution diagrams are shown. Signal distribution diagram is an indication of possible means of signal distribution. During installation actual need for signal distribution must be verified by installer, depending on signals available and actual hardware installation on the specific vessel.

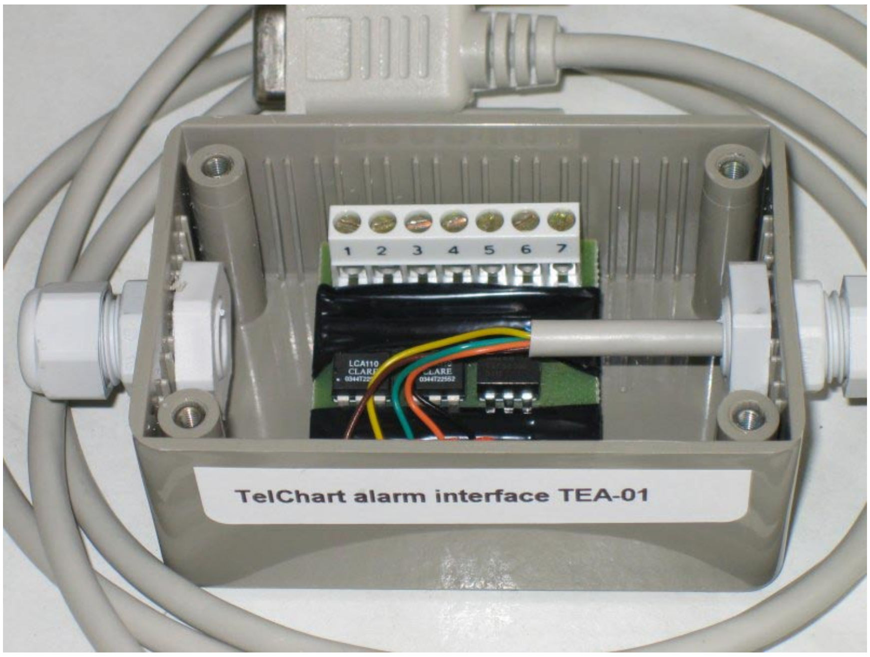
RS422 Box with 8xDB25 Female & Optical Isolation

RS-422 — DB25 Female — for Opt8F

Pin No.	Signal
2	RxD+(B)
3	TxD+(B)
7	GND
14	RxD-(A)
16	TxD-(A)

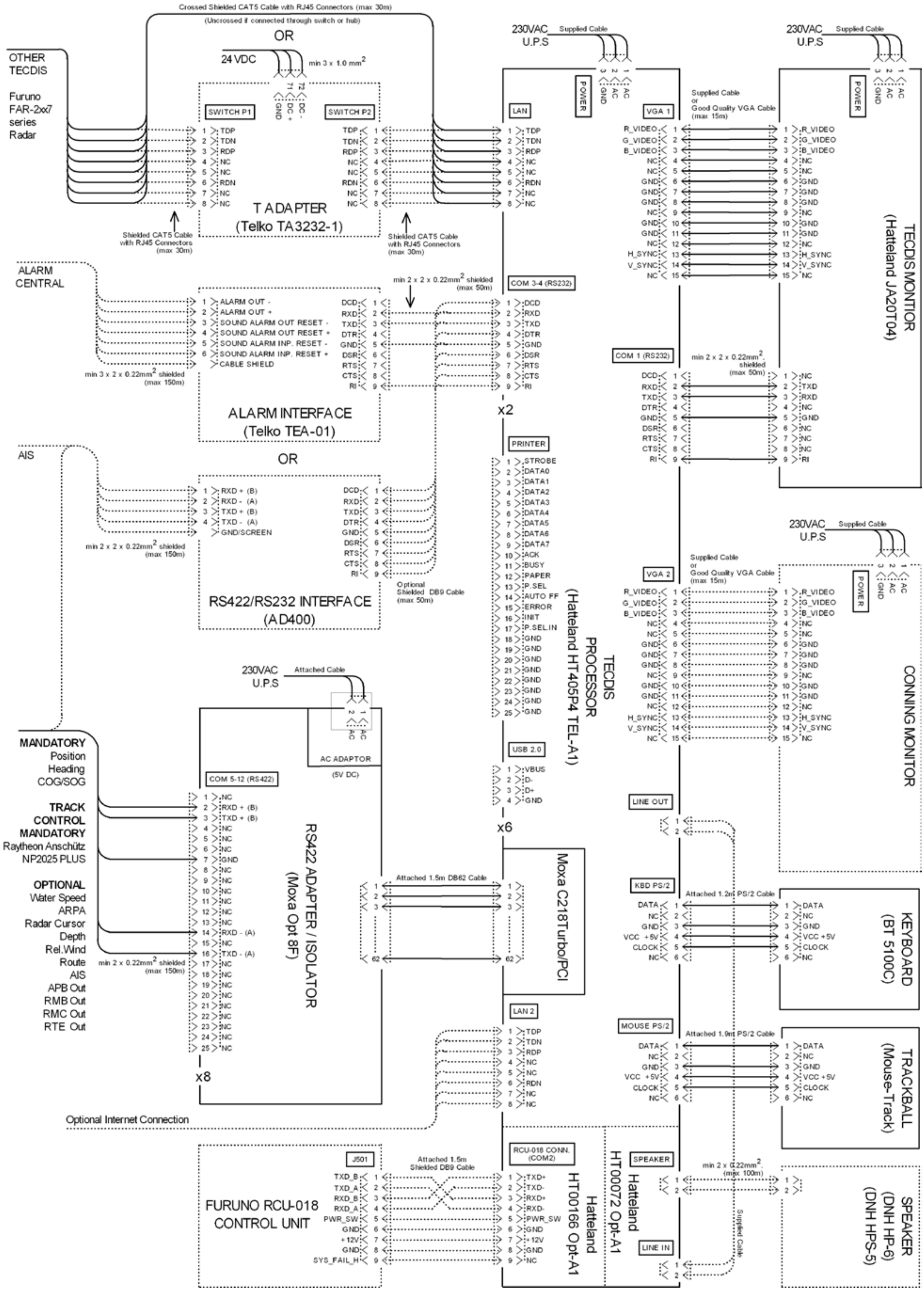


OPT8F needs external power supply. Use a 220 VAC power adaptor to supply 5 VDC to OPT8F.

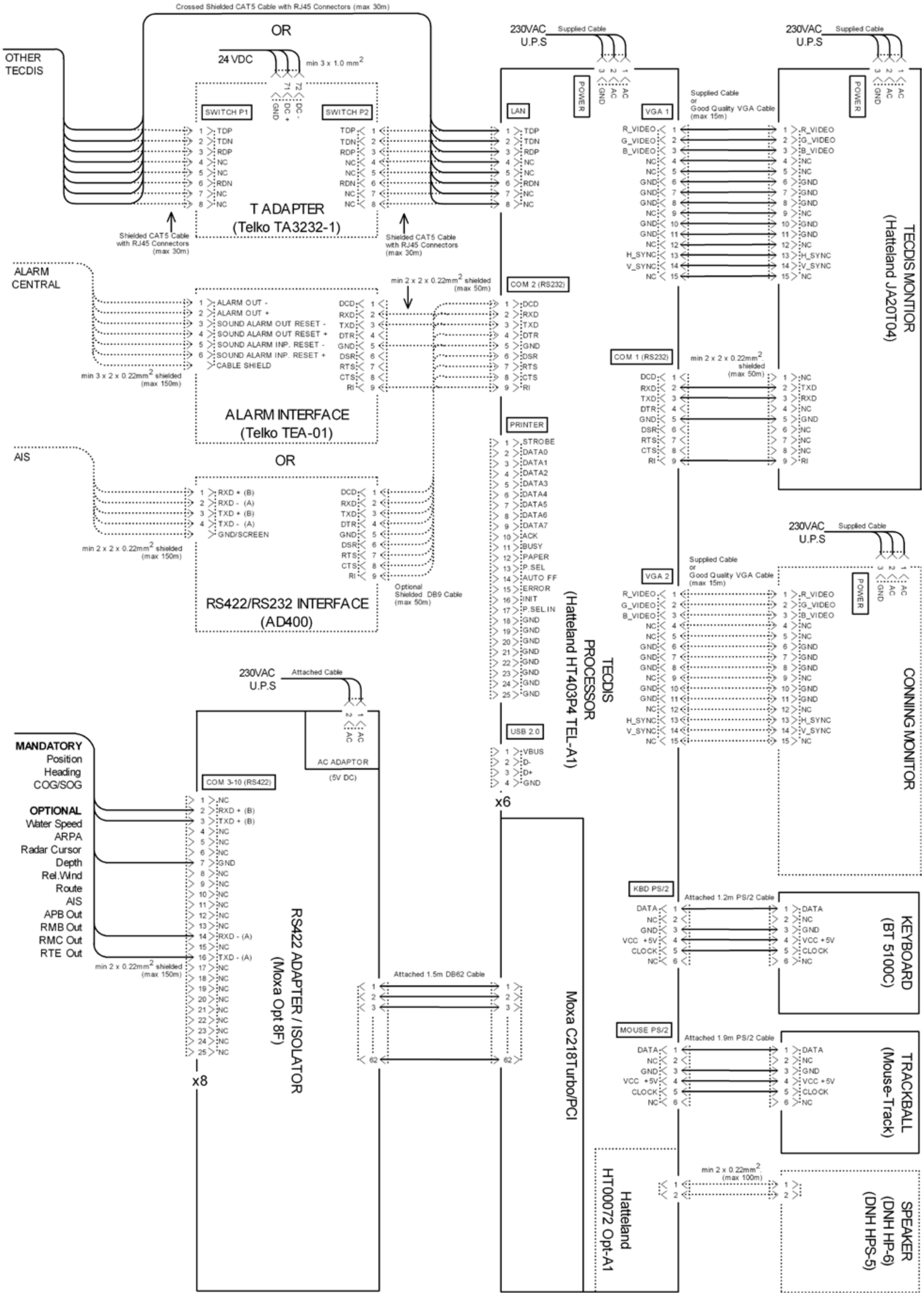


Internal wiring of TEA-01.

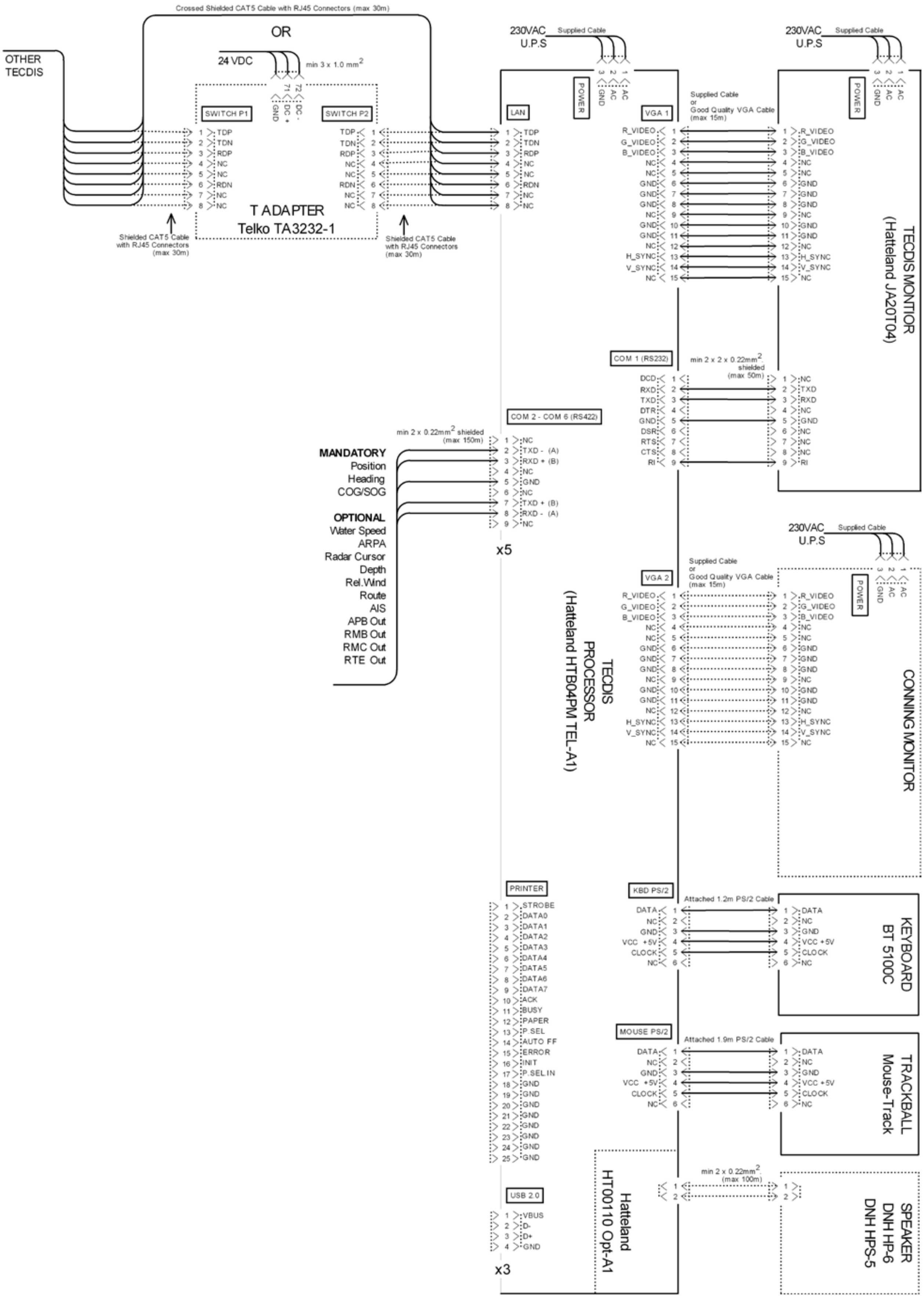
2.1 Wiring diagram (HT405P4 TEL-A1):



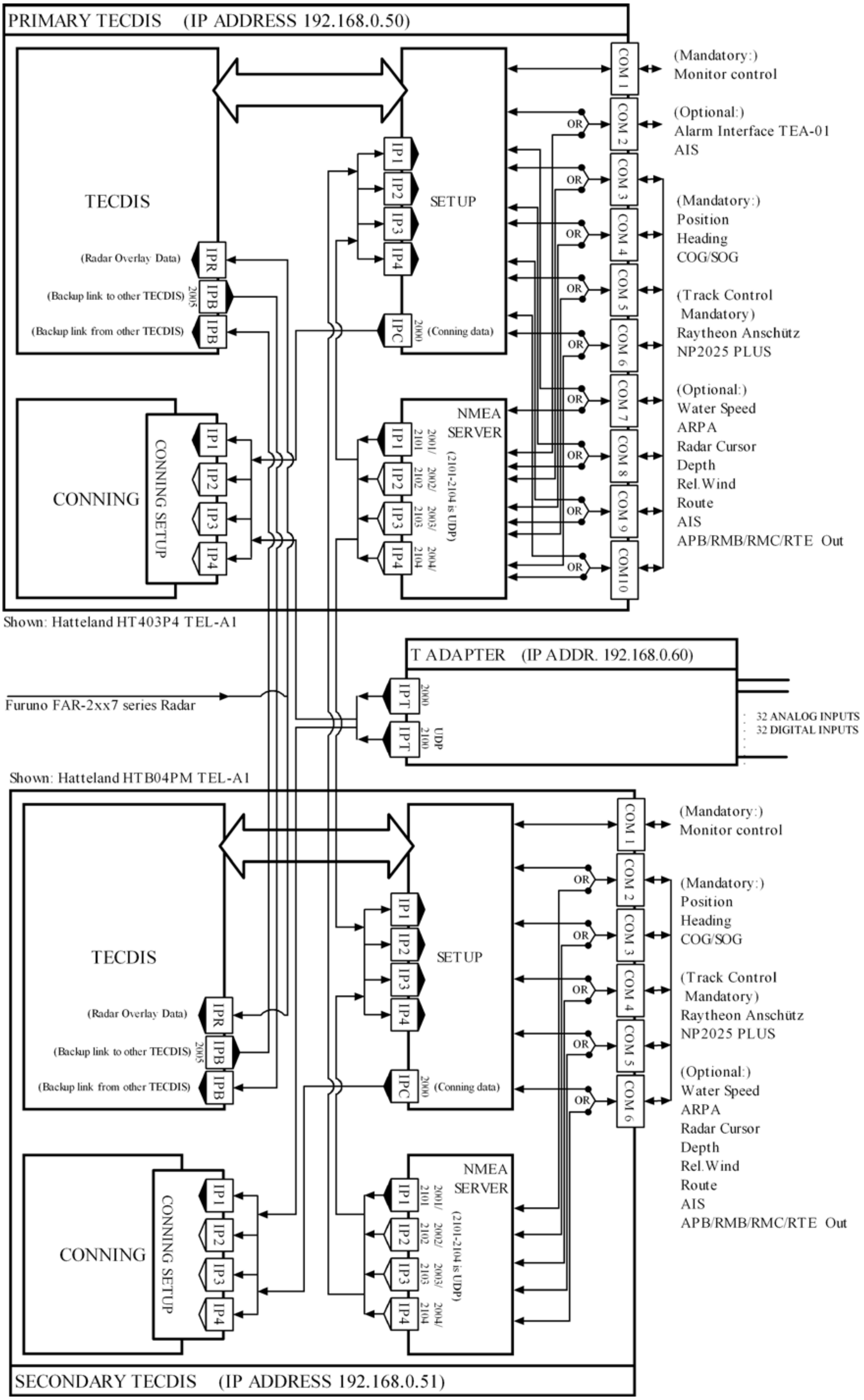
2.2 Wiring diagram (HT403P4 TEL-A1):



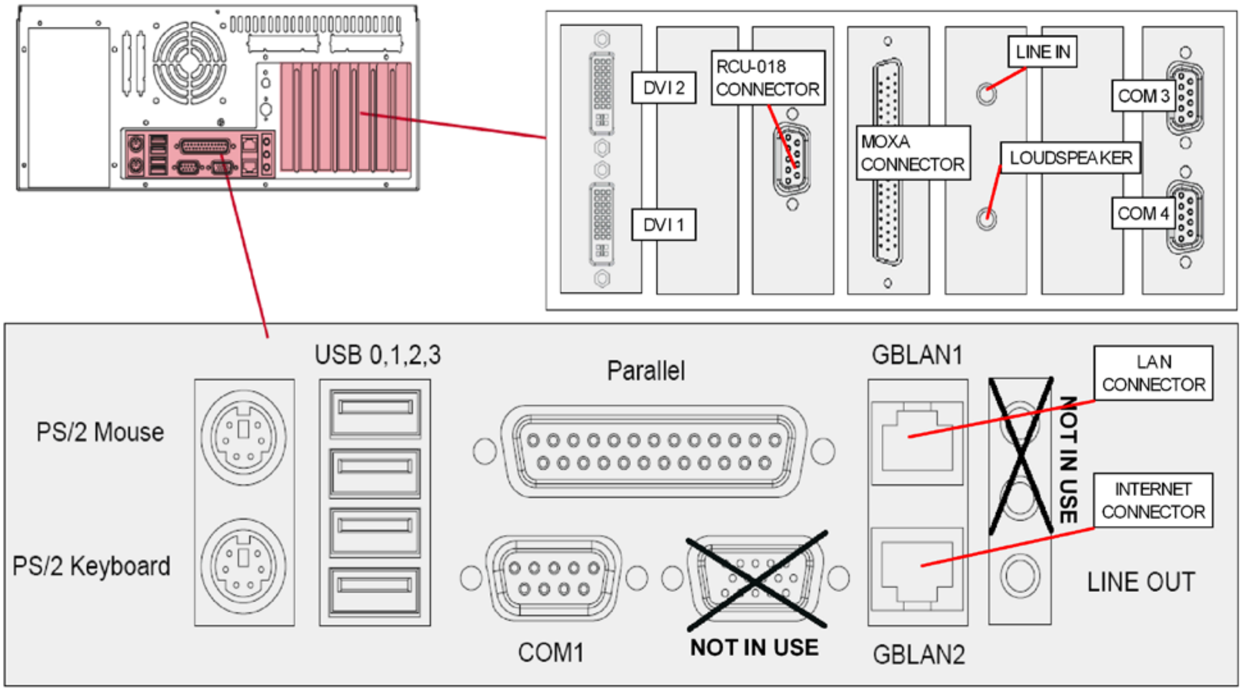
2.3 Wiring diagram (HTB04PM TEL-A1):



2.4 Signal distribution diagram (internal data flow):



2.5 Processor connectors, HT405P4 TEL-A1



- **NB! Only connect Furuno RCU-018 to RCU-018 connector. Proprietary connector supplies live 12V DC current and may damage any other equipment connected!**

- **To fully comply with type approvals:**
  -Ferrites (Würth 74271221) must be mounted on COM / LPT cables.
  -Ferrites (Würth 7427111) must be mounted on LAN cables.

- COM1, COM3 and COM4 are to be used for ECDIS monitor control, TEA-01 Alarm central interface. Other sensors may be connected to COM1, COM3 and COM4 via an RS232/RS422 interface (such as AD400).

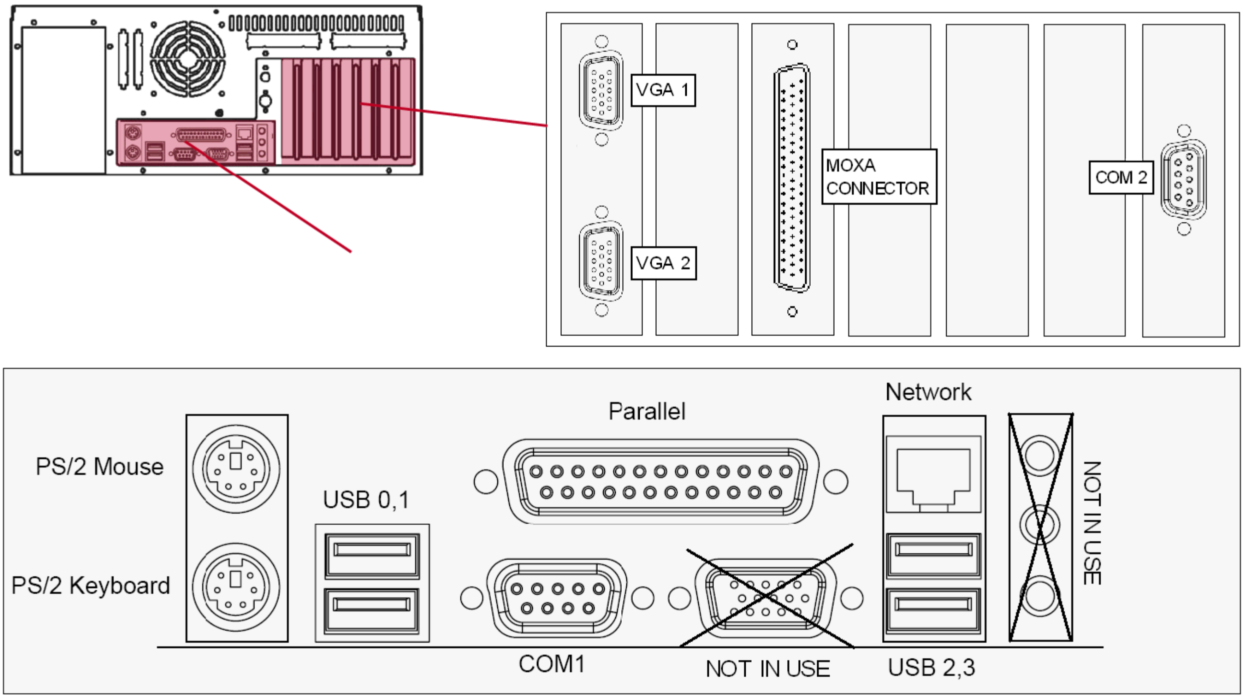
- We advise that only COM1, COM3 and COM4 are used to connect AIS, via an RS232/RS422 interface.

- If optional speaker connectors HT00072 Opt-A1 are used, LINE OUT and LINE IN are to be connected using the supplied cable.

- Lan connector GBLAN1 is to be used when connecting the TECDIS unit to other TECDIS units, T Adapter or Furuno FAR-2xx7 series radar.

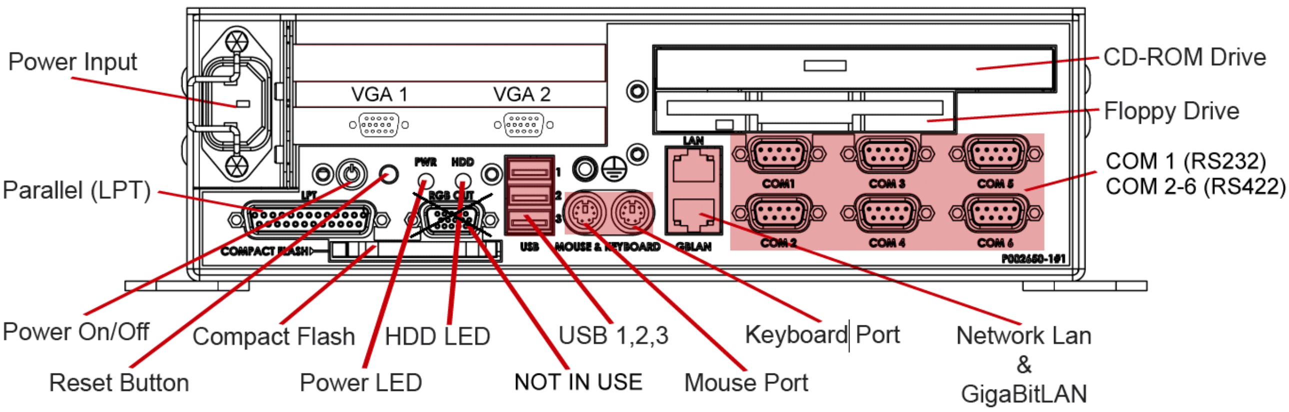
- Lan connector GBLAN2 can optionally be used for connecting the TECDIS unit to other networks or internet.

2.6 Processor connectors, HT403P4 TEL-A1



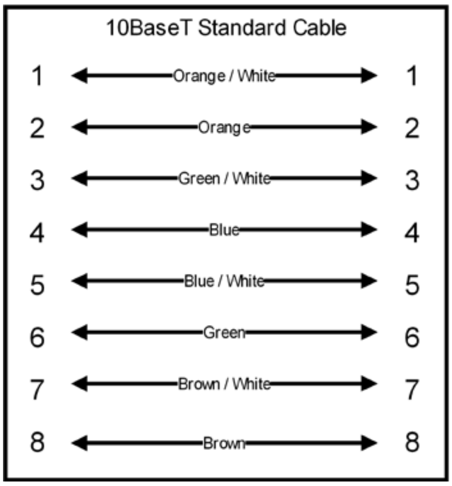
COM 1 and COM 2 are only to be used for ECDIS monitor control, TEA-01 Alarm central interface or AIS via an RS232/RS422 interface (such as AD400).

2.7 Processor connectors, HTB04PM TEL-A1



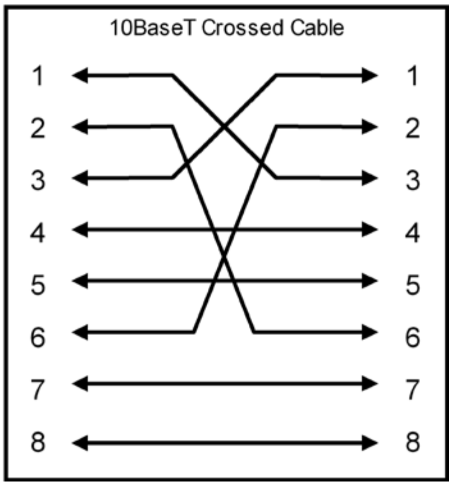
COM 1 is only to be used for ECDIS monitor control.

2.8 Ethernet connectors and cable

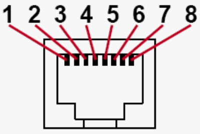


Use standard cable wiring when connecting a TECDIS unit with T Adapter (T3232-1).

Use crossed cable wiring when connecting a TECDIS unit directly with another.



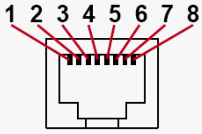
Pin Assignments - RJ45 10/100 LAN



Pin 01 - TDP	Transmit Differential Pair (Positive)
Pin 02 - TDN	Transmit Differential Pair (Negative)
Pin 03 - RDP	Receive Differential Pair (Positive)
Pin 04 - NC	Not Connected
Pin 05 - NC	Not Connected
Pin 06 - RDN	Receive Differential Pair (Negative)
Pin 07 - NC	Not Connected
Pin 08 - NC	Not Connected

Use category 5 - twisted pair cable

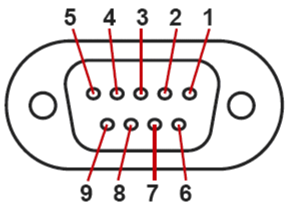
Pin Assignments - RJ45 10/100/1000 LAN



Pin 01 - D0P	Differential Pair 0 (Positive)
Pin 02 - D0N	Differential Pair 0 (Negative)
Pin 03 - D1P	Differential Pair 1 (Positive)
Pin 04 - D2P	Differential Pair 2 (Positive)
Pin 05 - D2N	Differential Pair 2 (Negative)
Pin 06 - D1N	Differential Pair 1 (Negative)
Pin 07 - D3P	Differential Pair 3 (Positive)
Pin 08 - D3N	Differential Pair 3 (Negative)

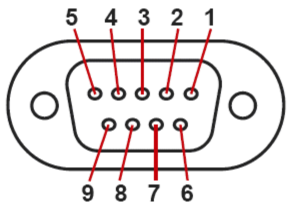
2.9 Other connectors

Pin Assignments - 9P Serial COM RS422



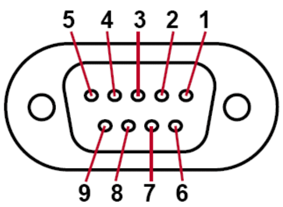
Pin 01 - N/C	Not Connected
Pin 02 - TX-	Transmit Data -
Pin 03 - RX+	Receive Data +
Pin 04 - N/C	Not Connected
Pin 05 - GND	Ground
Pin 06 - N/C	Not Connected
Pin 07 - TX+	Transmit Data +
Pin 08 - RX-	Receive Data -
Pin 09 - N/C	Not Connected

Pin Assignments - 9P Serial COM RS485



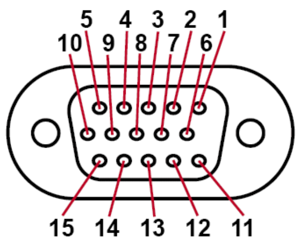
Pin 01 - N/C	Not Connected
Pin 02 - N/C	Not Connected
Pin 03 - DAT+	Data+
Pin 04 - N/C	Not Connected
Pin 05 - GND	Ground
Pin 06 - N/C	Not Connected
Pin 07 - N/C	Not Connected
Pin 08 - DAT-	Data-
Pin 09 - N/C	Not Connected

Pin Assignments - 9P Serial COM



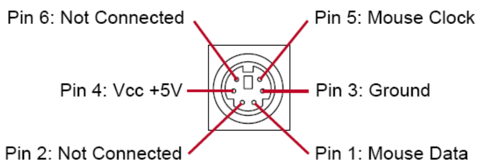
Pin 01 - DCD	Data Carry Detect
Pin 02 - SIN	Serial In or Receive Data
Pin 03 - SOUT	Serial Out or Transmit Data
Pin 04 - DTR	Data Terminal Ready
Pin 05 - GND	Ground
Pin 06 - DSR	Data Set Ready
Pin 07 - RTS	Request To Send
Pin 08 - CTS	Clear To Send
Pin 09 - RI	Ring Indicate

Pin Assignments - 15P HD RGB VGA

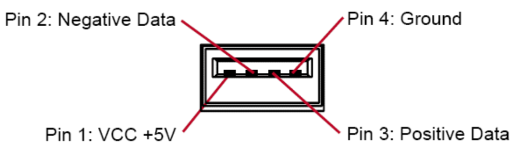


Pin 01	Red, analog
Pin 02	Green, analog
Pin 03	Blue, analog
Pin 04	Reserved for monitor ID bit 2 (grounded)
Pin 05	Digital ground
Pin 06	Analog ground red
Pin 07	Analog ground green
Pin 08	Analog ground blue
Pin 09	+5V power supply for DDC (optional)
Pin 10	Digital ground
Pin 11	Reserved for monitor ID bit 0 (grounded)
Pin 12	DDC serial data
Pin 13	Horizontal sync or composite sync, input
Pin 14	Vertical sync, input
Pin 15	DDC serial clock

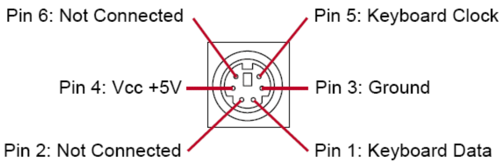
Pin Assignments - 5P PS/2 MOUSE



Pin Assignments - USB



Pin Assignments - 5P PS/2 KEYBOARD



Chapter 3: Parameter Setup

When you first starts the TECDIS computer it will automatically start up and enter the TECDIS program. Windows XP and TECDIS software are pre-installed. To exit TECDIS program for commissioning and installation setup procedures see chapter 2.1 for details.

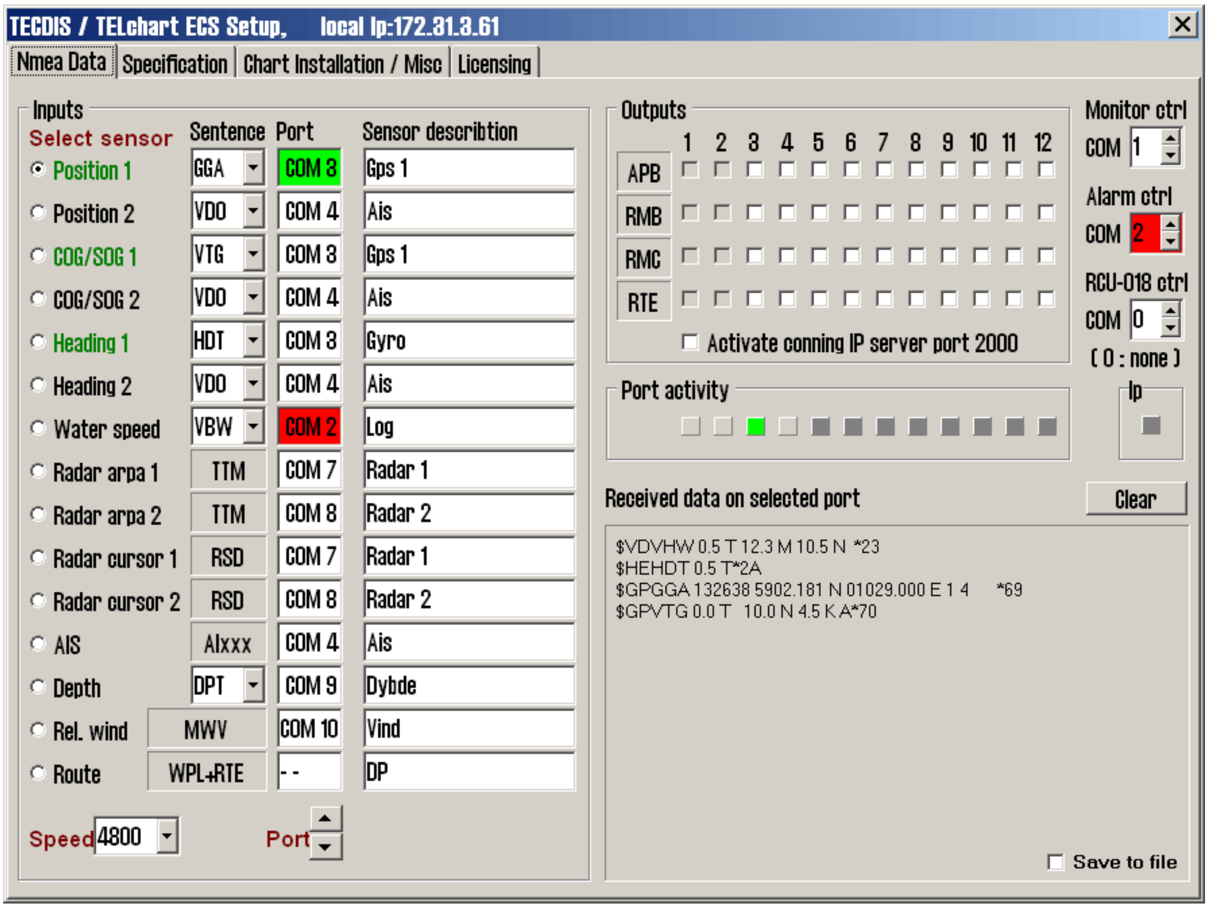
3.1. Service mode (Windows)

When you exit TECDIS (using the button at the upper left corner), the chart plotter will automatically be turned off after you confirm that you want to exit. In order to exit TECDIS without turning the chart plotter off, you must insert the USB service key (memory dongle) *before* you exit TECDIS. When this service key is connected to the chart plotter, the chart plotter will not be turned off when you exit TECDIS and you will be able to work in Windows (service mode) and open the Setup program by double clicking on the Setup icon on the desktop. When



service mode is available, a text indication is shown in the lower right corner of the chart.

3.2. NMEA data setup



Use this tab of the setup program to configure input and output signals. This is done by selecting the type of NMEA messages for each sensor type and the COM port where the signal is connected.

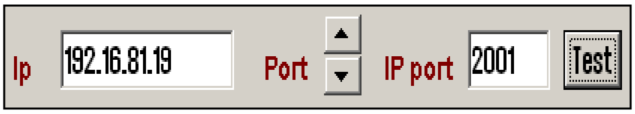
There are four main areas of this tab: “Inputs”, “Outputs”, “Port Activity” and “Received data on port X”.

3.2.1 Inputs

Note: All position inputs to TECDIS from all external sensors must be in WGS-84 format.

In the first area (“Inputs”), you can configure the message type and source of the different possible sensor inputs.
In the first column, “Select sensor” you can select which sensor you want to configure. **The sensor name will turn green when valid NMEA sentences of the type specified is received on the specified port.**
In the box next to “Sentence” you can select the type of NMEA sentence this input should be read from on a drop down menu. For more information about the different NMEA sentences, see the table below.
In the third box, (“Port”) you can select the COM port the selected sensor data type should be read from by using the two arrow buttons at the bottom of the column (to the right of the drop down menu for speed/port). **The COM port field will turn red if the specified COM port is already in use by monitor, alarm control or RCU-018. This means that the port selection is invalid, and that another COM port must be selected either for the sensor or the conflicting equipment.**
In the fourth column, “Sensor Description”, you can manually enter a text description that identifies the source instrument of the sensor data.

NB: When there is a port collision (when there is an attempt to use the same port for multiple conflicting functions), the affected ports are marked with red colour.



IP ports: TECDIS has 10 COM ports and 4 IP ports. For each IP port, the IP address and port number must be entered. The “Test” button establishes a connection to the IP server with the selected address/port number and the “Received data” area will show any data that is received.

Example: In order to receive position data from a GPS, you need to:

1. Select “Position 1” or “Position 2” from the “Select sensor” column.
2. Select the COM port the GPS is connected to in the “Port” field.
3. Select the NMEA sentence type to be used.
4. Optionally (but recommended) enter a description identifying the sensor as a GPS in the “Sensor Description” field. If the sensor signal is lost while the TECDIS is in operation, an alarm will be sounded. The alarm message will indicate the type of sensor lost as well as what port it is connected to and the sensor description you enter in this field. This way, you can quickly identify the failing instrument (instead of having to refer to the configuration in the Setup program). NMEA Sensor inputs and their status can also be displayed in TECDIS. (See chapter 3.1.3.1).

3.2.2 Speed

In this field you select the data speed to be used for the COM port of the currently selected sensor. The NMEA standard is 4800 (low speed). Be aware though that some instruments require a different data speed selection. There is also a NMEA high speed standard (38400). AIS units typically use high speed in order to transmit as much data as possible. (Select AIS in the “Selected sensor” column and check that the “Speed” field indicates the high-speed setting). The speed is changed by selecting the speed from the drop down menu.

NMEA sentence	Description
APB	Heading/Track Controller (Autopilot) Sentence ”B”
DBT	Depth Below Transducer
DPT	Depth
GGA	Global Positioning System Fix Data
GLL	Geographic Position – Latitude / Longitude
GNS	GNSS Fix Data
HDT	Heading, True
MWV	Wind Speed and Angle
OSD	Own Ship Data
RMB	Recommended Minimum Navigation Information
RMC	Recommended Minimum Specific GNSS Data
RSD	Radar System Data
RTE	Routes RTE
TTM	Tracked Target Message
VDO	UAIS VHF Data-link Own-vessel report
VBW	Dual Ground/Water Speed
VHW	Water Speed and Heading
VTG	Course Over Ground and Ground Speed
VWR	Relative (Apparent) Wind Speed and Angle
WPL	Waypoint Location

3.2.3 Outputs

In this area you can select which NMEA sentences you want TECDIS to output. In order to send a NMEA sentence type on a COM port, put a check mark in the box at the intersection of the desired sentence type row and COM port column. You can find descriptions of the different NMEA sentence types in the table above. Regarding the RTE route sentence; note that TECDIS will send up to 10 of the next waypoints of the currently active route.

By selecting ”Activate conning IP server port 2001” you activate a TCP/IP server in TECDIS for data transfer to the TECDIS Conning program. This option should only be selected when a connected TECDIS Conning unit should use data from TECDIS.

3.2.4 Port Activity

In this area you can see which ports that are receiving data. Whenever data is received on a COM port, the corresponding indicator in this area will flash green. The indicators are for COM ports 1-12 in increasing order from left to right.

3.2.5 Received data

In this area you can see the data that are being received from the COM port that is marked with green in the "Input" area. By clicking on one of the other COM ports in the "Input" area, the data shown in the "Received Data" area will change correspondingly.

3.2.6 Monitor and alarm ctrl

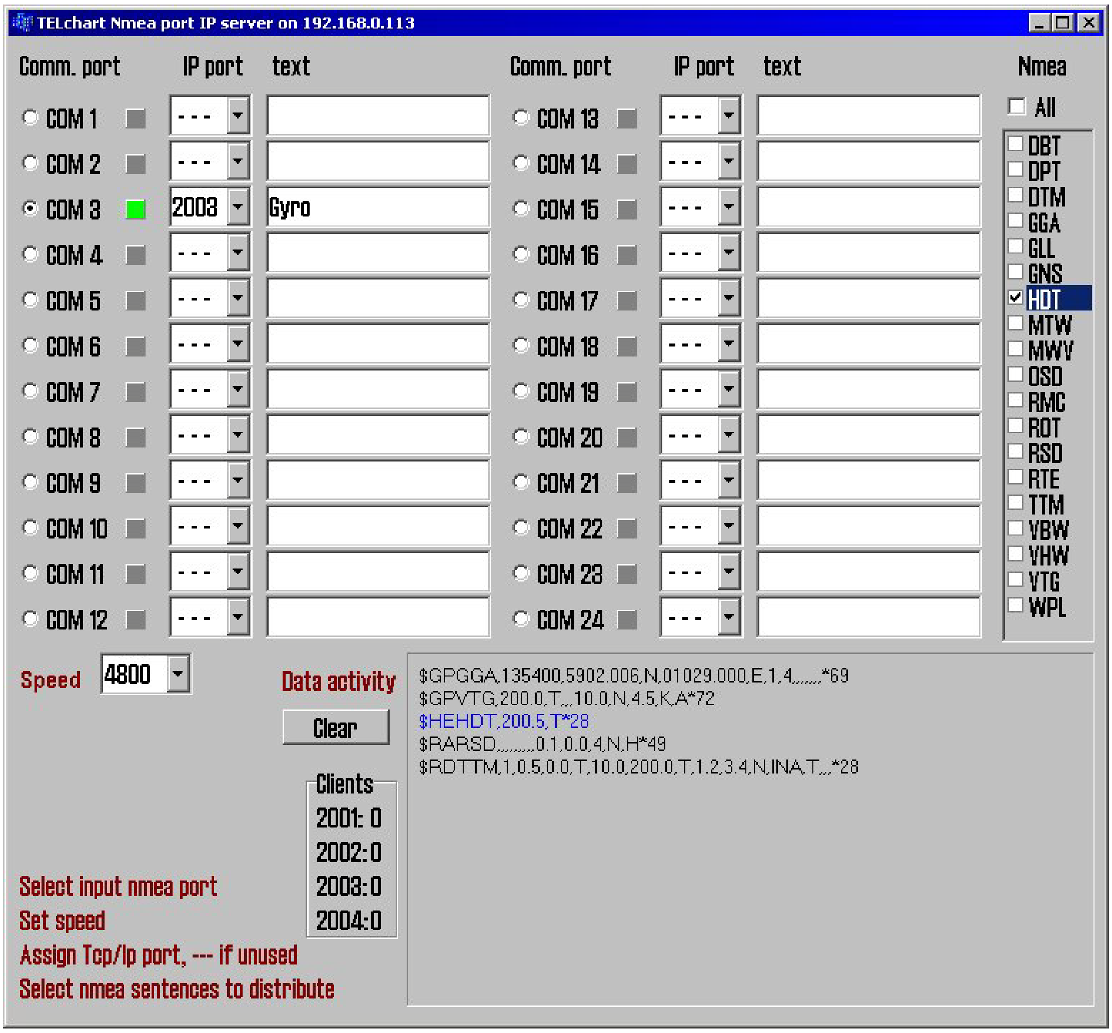
The units available in this area all require dedicated COM ports (if used). If not used, these settings should be set to '**0'**. **If the specified COM port is in use by a sensor, the selection field will turn red to indicate the conflict situation. This means that the port selection is invalid, and that another COM port must be selected either for the sensor or the conflicting equipment.**

Monitor Ctrl: Select the COM port that the monitor is connected to in this field. This connection will control the monitor background light and calibration settings, as well as the alarm sounder in the screen unit. (if used)

Alarm ctrl: Select the COM port that should be used for the alarm central interface. (if used)

RCU-018 ctrl: Select the COM port that the Furuno RCU-018 keyboard and trackball control unit is connected to. (if used)

3.3 TECDIS NMEA and TCP/IP server



Runs and outputs selected comport data out through a TCP/IP network. This way one sensor can be shared by multiple users in a TCP/IP network.

As shown above, “HDT sentence”, is received on comport 3 and is retransmitted on port 2003 through TCP/IP address 192.168.0.113. This means that backup ECDIS (or other connected computers to the LAN network) can receive “HDT” data through TCP/IP by selecting correct IP address (192.168.0.113 port 2003).

Setup procedure:

1. Select appropriate comport with desired data
2. Select appropriate baud rate on receiving comport, by using “**Speed**” dialog box
3. Select to which TCP/IP ”port” it shall retransmit data (from the selected comport), for exsample 2003
4. Describe with text connected device to TCP/IP port (backup station, conning PC etc.)
5. Select which NMEA sentences you which to send (you may select one, multiple or all on one TDP/IP port)

”**Data activity**” shows activity on selected (monitored) comport. HDT is marked in blue due to it is selected for output to TCP/IP.

”**Clients**” shows how many listeners (connections) there are on each connected TCP/IP port.

Logical description and ranking of NMEA sentences.

TELchart ECDIS can use the following sentences from a GPS transmitter, number one have the highest ranking/priority:

Position
1. $??GNS GNSS fix data
2. $??GGA GPS fix data
3. $??GLL Geographic position lat/long
4. $??RMC Recommended minimum specific GNSS data
5. !AIVDO * AIS own ship position. UAIS VHF Data link own-vessel report

Course & Speed
1. $??VTG Course and speed over ground
2. $??RMC Recommended minimum specific GNSS data
3. $??OSD Own ship data
4. !AIVDO AIS own ship position. UAIS VHF Data link own-vessel report

Heading
1. $??HDT Heading true
2. $??OSD Own ship data
3. $??VHW Water Speed and Heading
4. !AIVDO AIS own ship position. UAIS VHF Data link own-vessel report

Radar ARPA
$??TTM Tracked Target Message

Radar Cursor
$??RSD Radar System Data

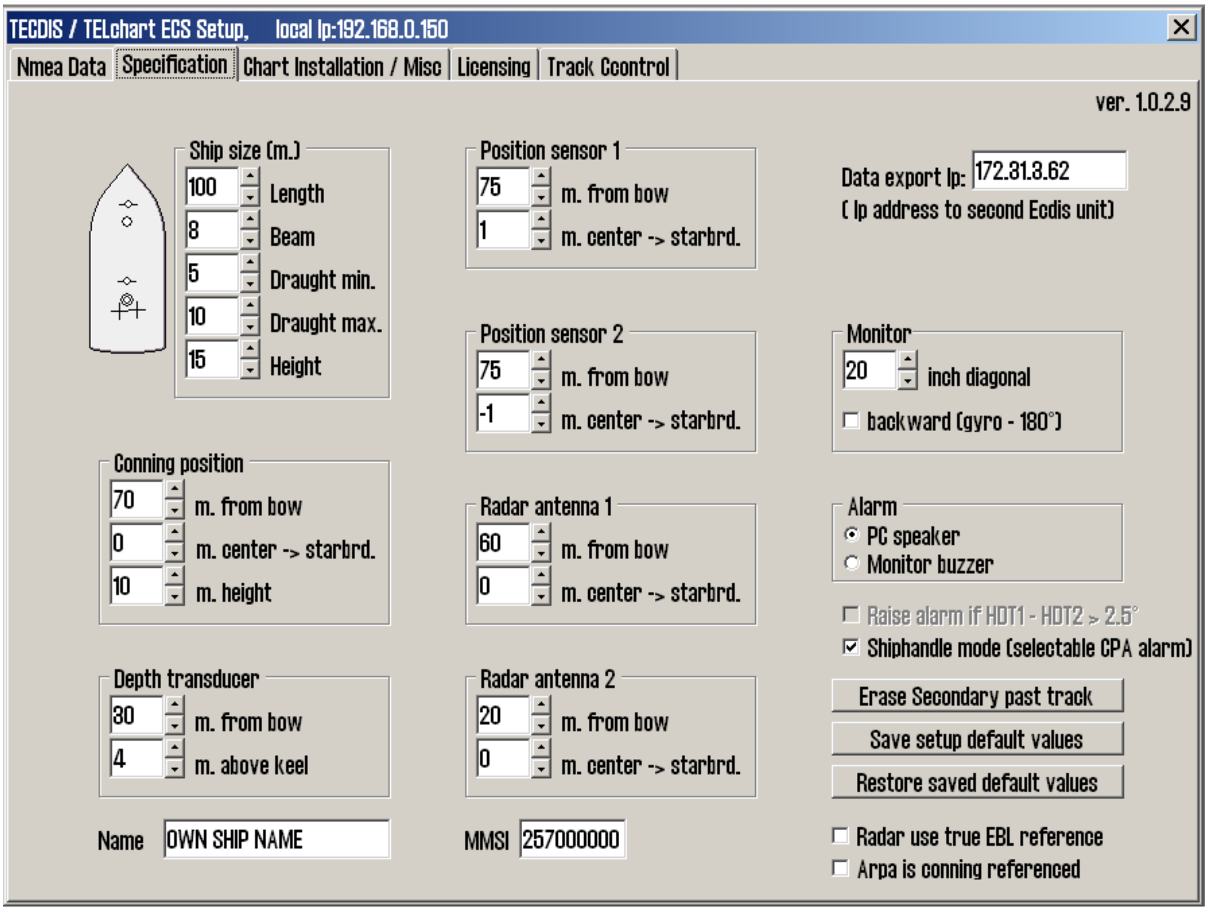
AIS
!AI??? AIS UAIS VHF Data Link

Depth
1. $??DPT Depth
2. $??DBT Depth below transducer

* Position: !AIVDO may be used as a secondary position source whenever primary source is missing.

3.4 Specification

On this tab, the dimensions of the vessel and the placement of sensors on the vessel is specified. Specifying the position of the sensors is important in order to get the highest possible accuracy in position (GPS antenna) and other data as possible.



- In the “Ship Size” area, enter the length, beam, draught and height of the vessel in meters. For length and beam, the largest extent of vessel length and beam should be used.

- For draught and height you enter the largest possible height and draught taking load conditions into consideration.

- When a second TECDIS unit is present in the installation (for example, bacup unit). The IP address of the second TECDIS unit should be entered in the ”Data export IP” field. This will activate automatic transfer of active routes to the second TECDIS, and it will be possible to transfer data (objects, tracks, routes) to the second unit.

- Backward (gyro-180º): checking this box turns the heading value from gyro 180 degrees.

- In the “Alarm” area, you can select whether sound alarms should sound through the PC speaker in the chart plotter, or through the monitor buzzer.

- If two positioning methods are in use, the button “Erase Secondary past track” allows you to remove the past track line from the secondary position sensor.

- Arpa is conning referenced: when this checkbox is marked, it is assumed that target information from Arpa radar is already adjusted to the navigator position. If it is not marked, TECDIS will do the necessary adjustments.

- Raise alarm if HDT1-HDT2 > 2.5º: when this box is checked, an alarm will be given if the heading from the two sensors ”Heading 1” and ”Heading 2” deviates with more than 2.5 degrees.

- Shiphandle mode (selectable CPA alarm): when this option is activated, it will be possible to suppress CPA alarms (see chapter 3.7.3).

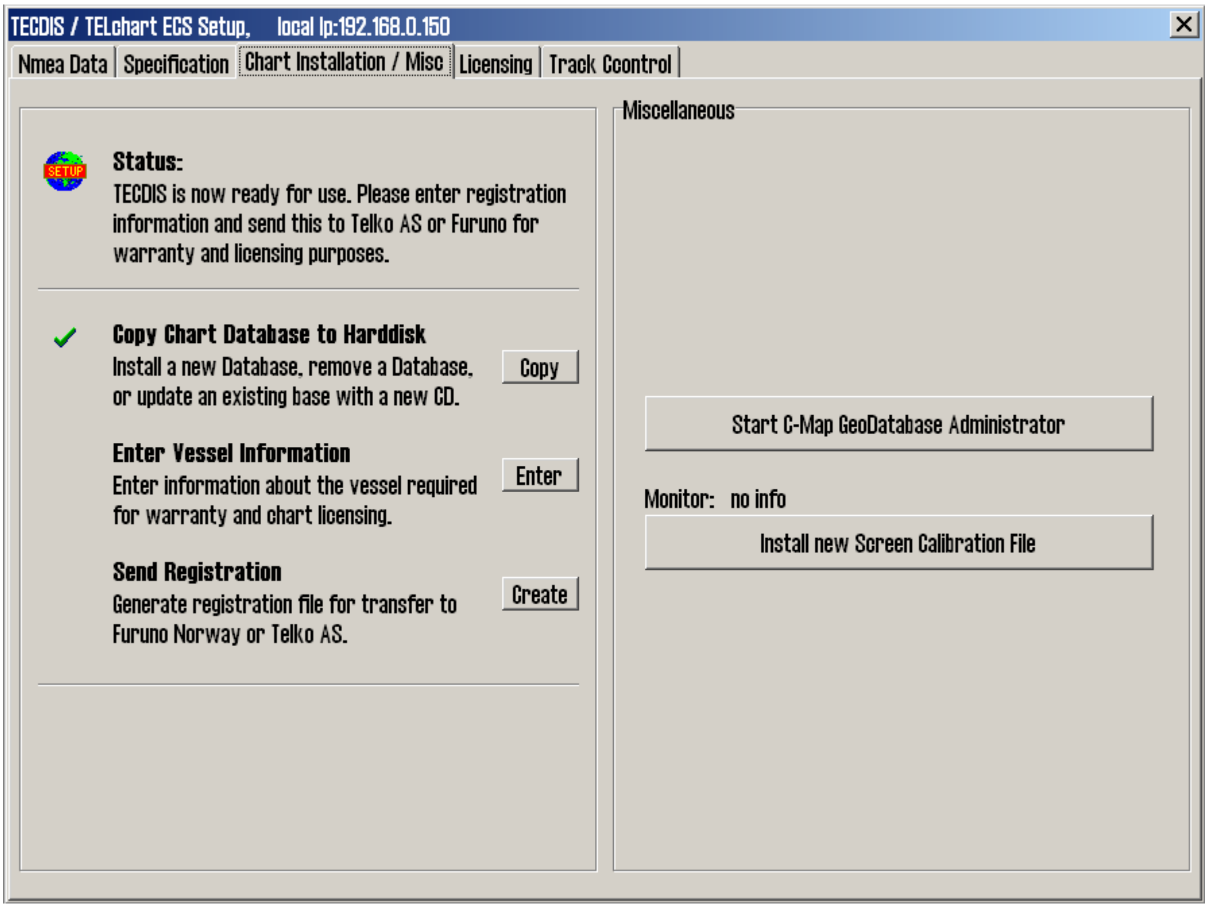
1. Save and restore setup default values

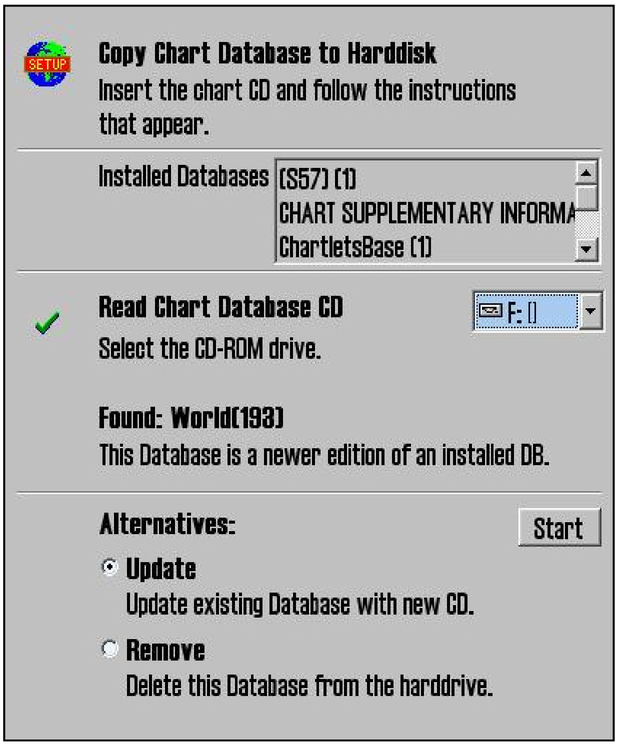
By clicking the button “Save setup default values”, all settings in the “Nmea data” and “Size and sensors” tabs are saved as default settings. If temporary changes to the settings are made later, the default values can be restored by clicking the button “Restore saved default values”.

For future use and to be certain that no misunderstandings may occur regarding the installation we recommend that the service engineer saves the default setup file to floppy disk or other media. He can then keep this file in his personal register of TECDIS installations.

The file is located at: C:\Program files\TECDIS\dta4.setup

3.5 Chart Installation / Misc

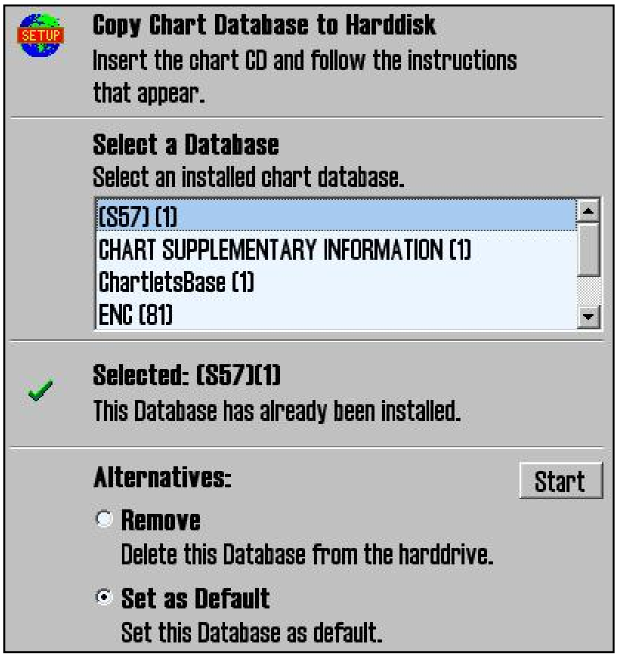




3.5.1 Install, update or remove chart databases

By clicking “Copy”, a new area with an overview of installed chart databases is opened. Insert the CD for the chart database that is to be operated on and select the CD-ROM drive from the drop down menu below the database list. The Setup program will read the CD and display the available actions for the chart database. (Install, Update, Remove and ‘Set as Default’).

Important: ‘Purchase’ chart licenses are locked to a specific edition of the chart database. If a different edition of the database is installed, new licenses must be acquired. ‘Subscription’ licenses remain valid when newer chart database editions are installed.

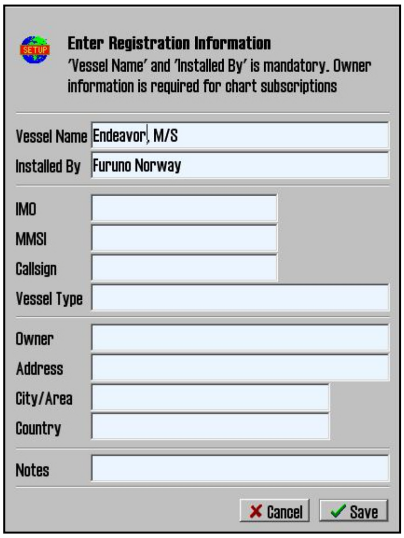


If a CD is not available for the chart database (As would be the case for databases containing imported S57 data), these databases can be selected for modification by choosing a drive *other than the CD-ROM drive* from the drive drop down menu. (For example D:\). When Setup is unable to find a chart database on the selected drive, you get the option to manually select an installed database by pressing the button “Select an Installed DB”.

You will get two options for the database you select from the list of installed databases: “Remove” and “Set as Default”. We recommend that the “World” database should be set as default, if installed.

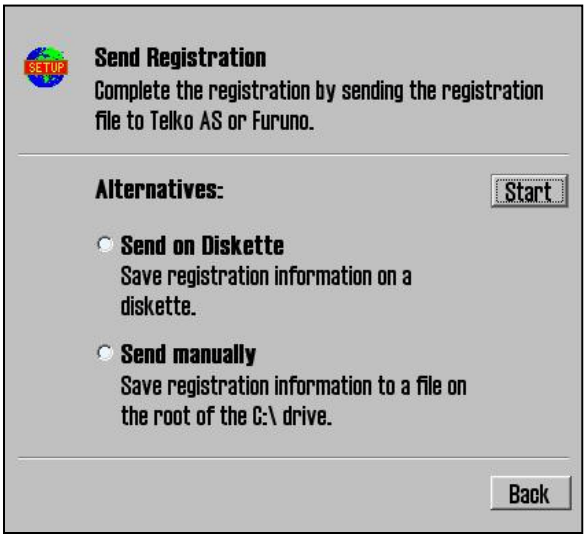
Important: Some chart databases are protected and cannot be removed unless you have a CD for the database available.

The option ‘Remove Licenses’ will also be displayed in some instances. Selecting this option and pressing ‘Start’ will allow you to remove all chart licenses for the specified database. Make sure you have new valid chart licenses available before starting this option!



3.5.2 Enter vessel information:

In this area, information about the vessel and owner should be entered. This information is needed for chart licensing and warranty purposes.

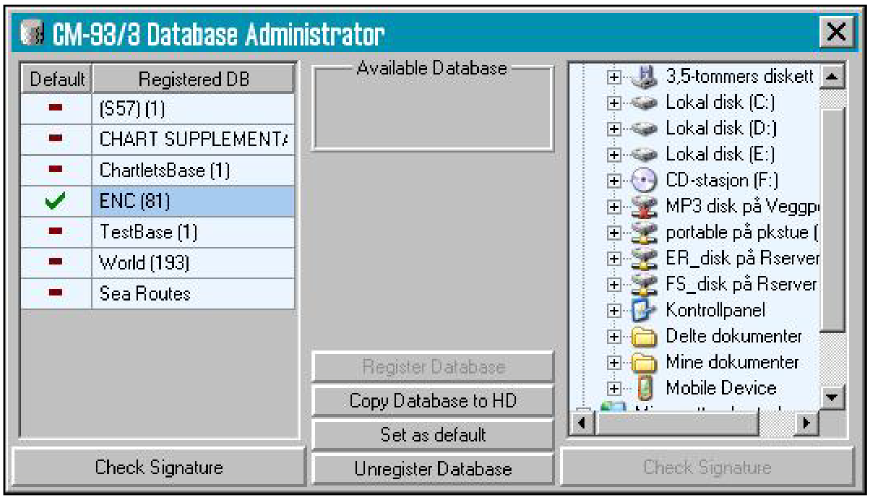


3.5.3 Send registration

When the vessel information has been entered and stored, the option to send registration will be enabled on the main area of this part of the Setup program. If "Send on Diskette" is selected, the registration file will be saved to an inserted diskette. If "Send Manually" is selected, the registration file will be saved on the hard drive and a message informing you about the file name and location of the file. Send this file to the specified email address whenever the "Vessel information" data is changed.

3.5.4 Start C-Map GeoDatabase Administrator

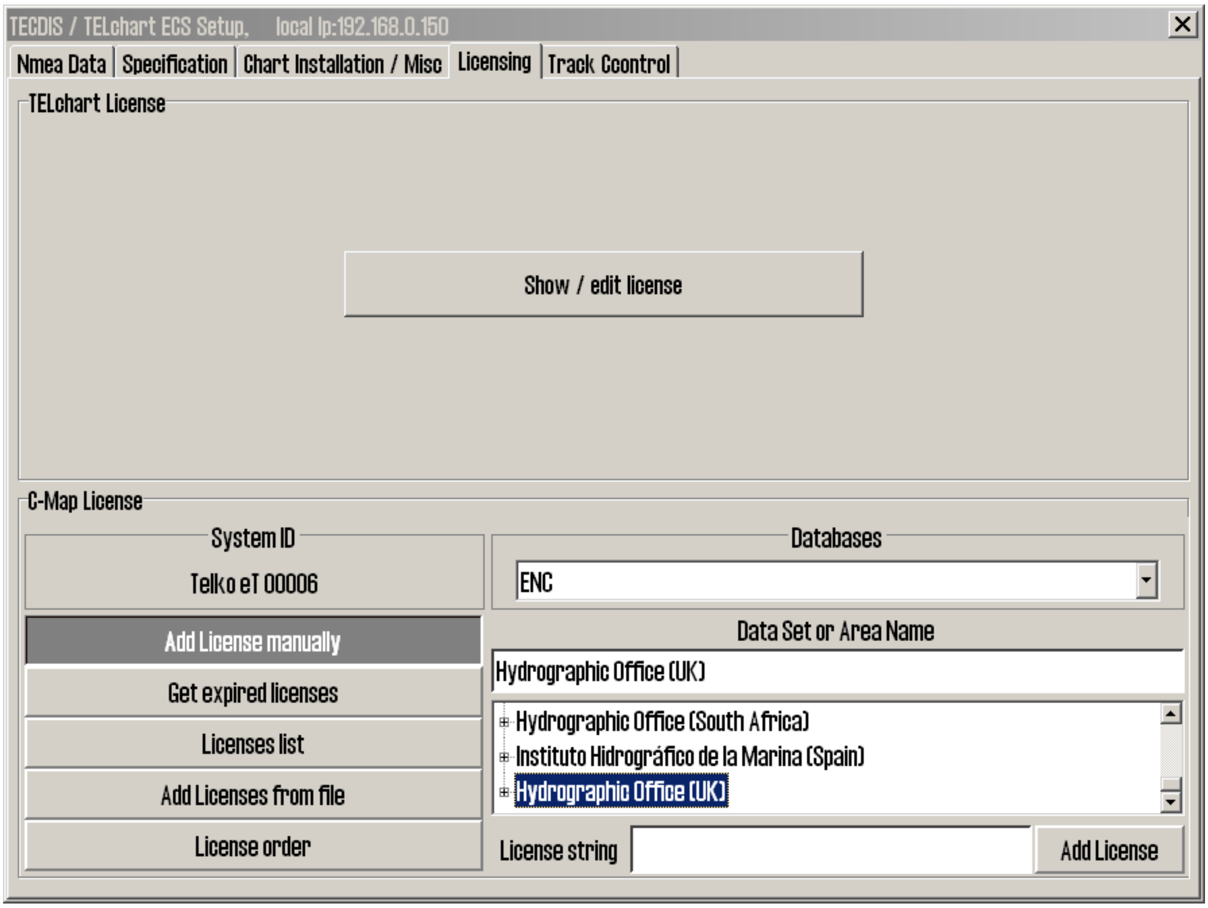
By selecting a chart database and clicking "Check Signature", it is possible to verify that the database has not been corrupted and is in the same state as when provided by C-Map.



3.5.5 Install new Color Calibration file

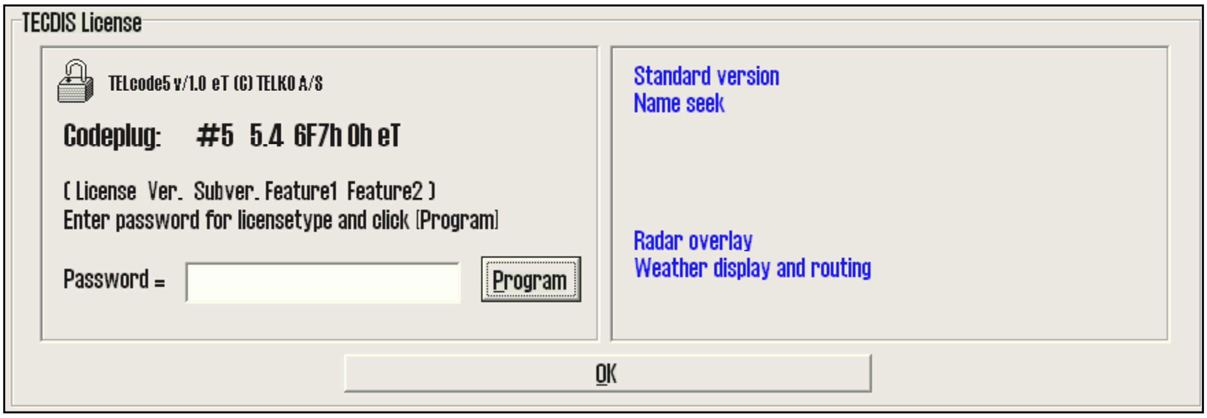
The "Install new Color Calibration file" button is used to load a new color calibration data file (Extension .czp) that will ensure that the colors used in the chart display are as accurate as possible. Such a file is either received with the monitor or obtained from Furuno Norway, Telko AS or the producer of the monitor.

3.6 Licensing



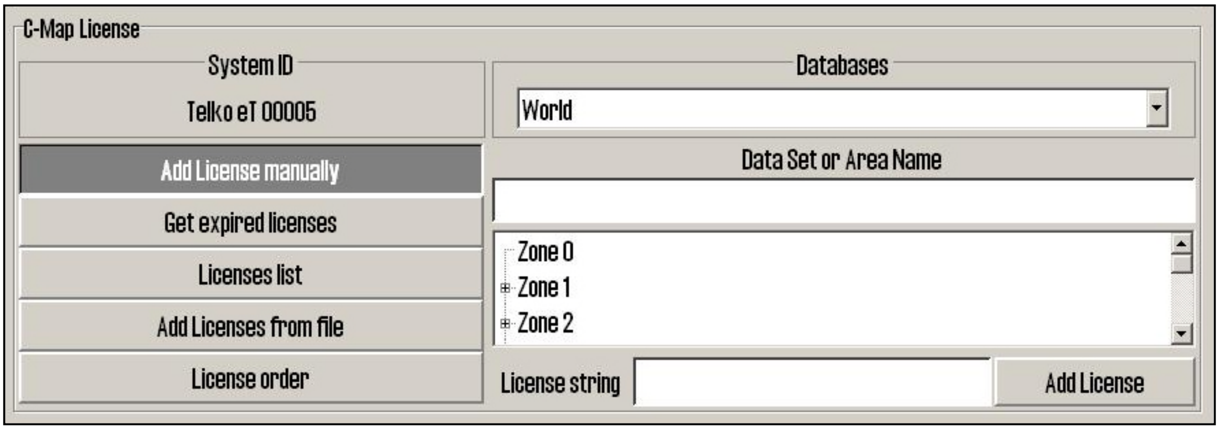
3.6.1 TECDIS license

By clicking "Show / edit license" information about the current system license is shown as illustrated below. This information includes the license number and version information, and a list of installed optional components in blue in the right part of the area. In order to activate additional optional components, a password for this should be entered in the "Password" field and the "Program" button should be clicked.

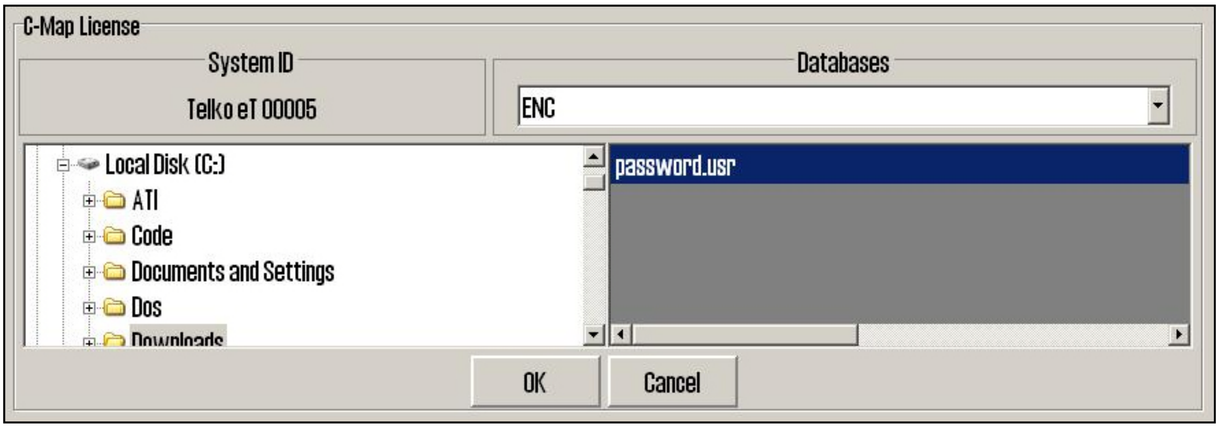


3.6.2 C-MAP License

Add licenses manually: Select the zone or area you have received a license for in the window to the right (under "Data set or Area name"). The 16-character license code is entered in the "License string" field. Finally, click on "Add License" to activate the license.

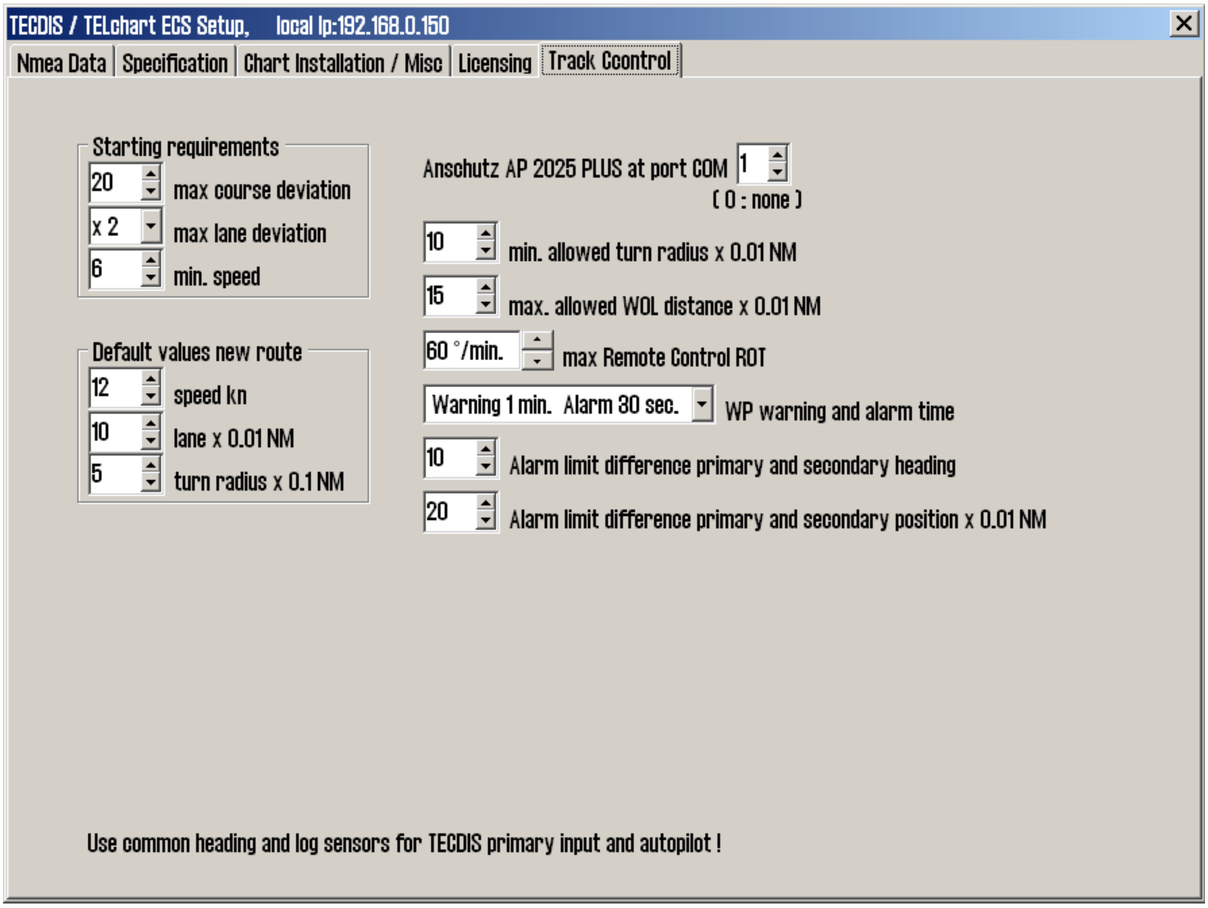


Add license from file: Use this option if you want to use a supplied password.usr file to activate chart licenses, browse to the location of this file and select it and press "OK". The licenses contained in the file will be automatically activated.



In this area, it is also possible to get a list of licenses that are expired and no longer valid ("Get expired licenses"), to see a list of all valid licenses ("Licenses list") and to generate an order file for new licenses ("License order").

3.7 Track Control



On this tab, settings for connection to Raytheon Anschütz AP2025 PLUS autopilot and Track Control can be set.

Refer to Raytheon Anschütz AP2025 PLUS Installation Manual for installation and configuration of the autopilot. NB: The autopilot and TECDIS must be supplied with the same heading and log sensor inputs!

3.7.1. Starting Requirements

The values in this area specify the conditions needed before Track Control mode can be activated.

Max course deviation The maximum number of degrees the course over ground (COG) of the vessel can differ from the planned course.

Max lane deviation The maximum distance of the vessel position from the planned route leg, expressed as a multiplier of the planned route leg lane width. (For example, if the lane setting for the initial planned route leg is 100m, and 'max lane deviation' is set to x2, the vessel position can be up to 200m from the planned route leg when Track Control is activated.)

Min. speed The minimum speed of the vessel in knots.

3.7.2 Default values new route

The values in this area will be used as the default values for the parameters specified when planning a new route.

Speed kn	The default planned speed in knots for new route legs.
Lane x 0.01 NM	The default planned lane width for new route legs, expressed as hundredths of a nautical mile. (For example, if the value specified here is 10, the default lane width would be 0.1 NM.)
Turn radius x 0.1 NM	The default planned turn radius for new route legs, expressed as tenths of a nautical mile. (For example, if the value specified here is 5, the default turn radius would be 0.5 NM.)

3.7.3 Other settings

Anschütz AP 20205 PLUS at COM
Specify the COM port that the Raytheon Anschütz AP 2025 PLUS autopilot is connected to.

Min. allowed turn radius x 0.01 NM
This setting specifies the minimum turn radius allowed, expressed as hundredths of a nautical mile. This value should be determined during vessel sea trials.

Max. allowed WOL distance x 0.01 NM
This setting specifies the maximum value allowed for operator selected Wheelover Line (WOL) distance, expressed as hundredths of a nautical mile.

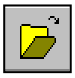
Max Remote Control ROT
This setting specifies the maximum rate of turn (ROT) value allowed in the autopilot remote control panel in TECDIS, expressed as degrees per minute.

WP warning and alarm time
This setting controls how long before a waypoint warnings and alarms are generated.

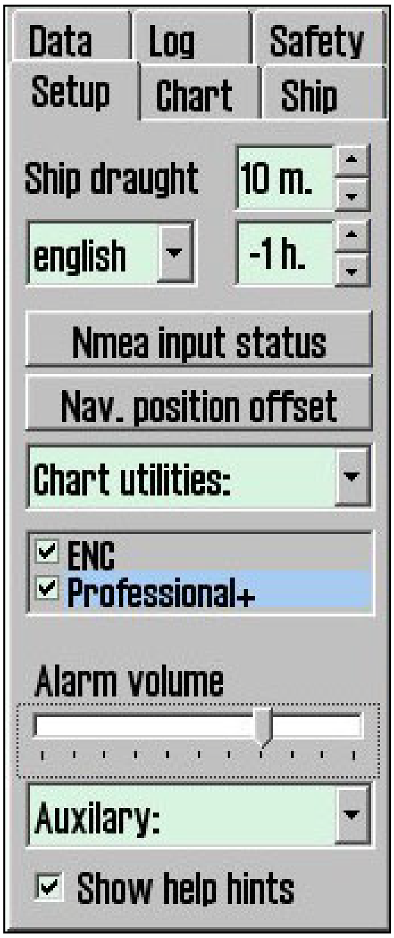
Alarm limit difference primary and secondary heading
This setting controls the number of degrees the primary and secondary heading sensor values can differ before an alarm is generated. If the two heading sensors differ by more than this value, an alarm is generated in TECDIS.

Alarm limit difference primary and secondary position x 0.01 NM
This setting controls the distance allowed between the two position sensors before an alarm is generated, expressed in hundredths of a nautical mile. If the distance between the positions reported by the two position sensors is larger than this value, an alarm is generated in TECDIS.

Chapter 4: Operational system settings



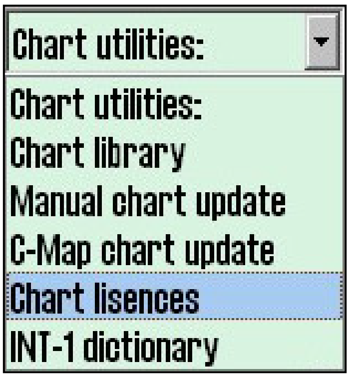
When pressing menu folder in the top menu bar, menu folders vil open in the lower part of the side menu field. There are 6 different menu folders: data, logg, safety, setup, chart and ship. Folders are separated in a archive system and one of the folders is displayed at time. Select desired folder by pressing a tag in the archive hieraky.

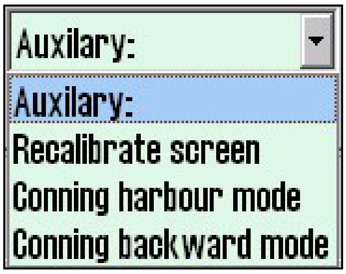


4.1. Setup

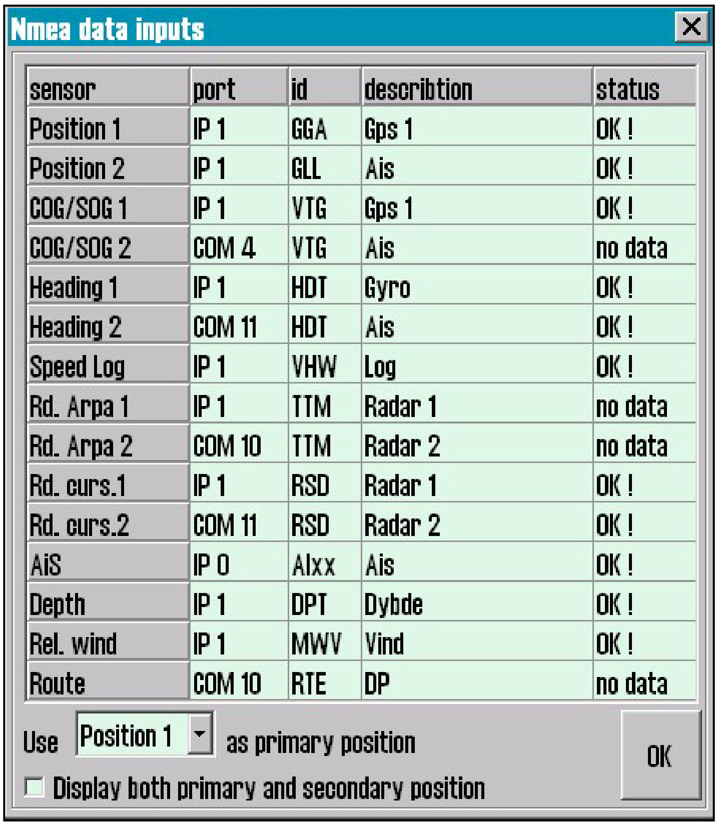
This folders contains.

1. Ship draught
2. Language selection
3. Time zone selection
4. Nmea input status
5. Nav. Position offset
6. Chart utilities
7. Chart library (installed charts)
8. Auxilary
9. Alarm volume (only shown when alarm bell is set to pc speaker in the setup programme)
10. Hide/unhide tool tip.(see chapter 2.1)





Ship draught: minimum and maximum ship draught is defined in the setup program. When TECDIS starts, the maximum draught is used as default, but this can changed in the setup menu folder.



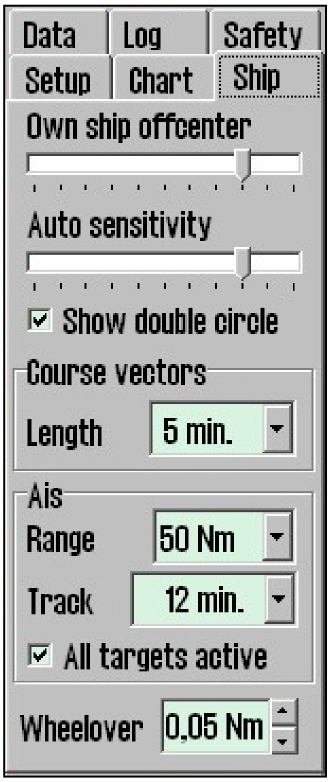
sensor	port	id	describtion	status
Position 1	IP 1	GGA	Gps 1	OK !
Position 2	IP 1	GLL	Ais	OK !
COG/SOG 1	IP 1	VTG	Gps 1	OK !
COG/SOG 2	COM 4	VTG	Ais	no data
Heading 1	IP 1	HDT	Gyro	OK !
Heading 2	COM 11	HDT	Ais	OK !
Speed Log	IP 1	VHW	Log	OK !
Rd. Arpa 1	IP 1	TTM	Radar 1	no data
Rd. Arpa 2	COM 10	TTM	Radar 2	no data
Rd. curs.1	IP 1	RSD	Radar 1	OK !
Rd. curs.2	COM 11	RSD	Radar 2	OK !
AiS	IP 0	AIxx	Ais	OK !
Depth	IP 1	DPT	Dybde	OK !
Rel. wind	IP 1	MWV	Vind	OK !
Route	COM 10	RTE	DP	no data

4.1.1. Nmea data inputs:

Displaying a list describing which ports the various sensor information is recived from. Also displaying which Nmea sentences used and the data communication status. This is only a information window. Changes have to be made in the separate setup program. (see chapter 7).

Position fixing: Displays 2 sources for positioning. Primary and secondary can be selected. Primary and secondary can be displayed simultaniously on the chart display. If primary position fixing system falls out, the system automatically uses secondary. If both positioning systems drops out, change over to dead reckoning is executed. (Log+Gyro)

4.2. Operational parameters for the Ship



4.2.1. Own ship offcenter
Location of own ship on the screen. High value: Vessel is placed more offcenter. Low value: vessel is placed closer to screen centre. This function is only active when auto function is enabled.

4.2.2. Auto senitivity
How often chart to be centered/shifted in Auto mode.

4.2.3. Show double cirle
The boat symbol can be displayed with or without circles.

4.2.4. Course vectors
Sets vector length on own ship and targets. (One cross line on vector is one minute).

4.2.4. AIS range and track
AIS area/coverage and track settings. All targets can be set to active.Detailed info about AIS in chapter 6.5.

4.2.5. Wheelover
Wheel over line distance from Waypoint. New command to track pilot and route monitoring.

Please verify with the vessel's **Master** these values before finalizing the installation. These parameters are not part of the setup program, but are included in the normal program.

4.3 Chart library

Chart library displays av overview of all chart in a database. Selecting a database from the drop down menu a list with all charts in the database appears, sorted by publisher. Highlight a chart in the list to display further information (middle field). When double clicking on a chart in the list, it will appear if licens is present. When vessel is sailing, vessel is automatically centered. (if not auto function is disabled).

NB: Chart library only displays databases selected in setup menu folder.

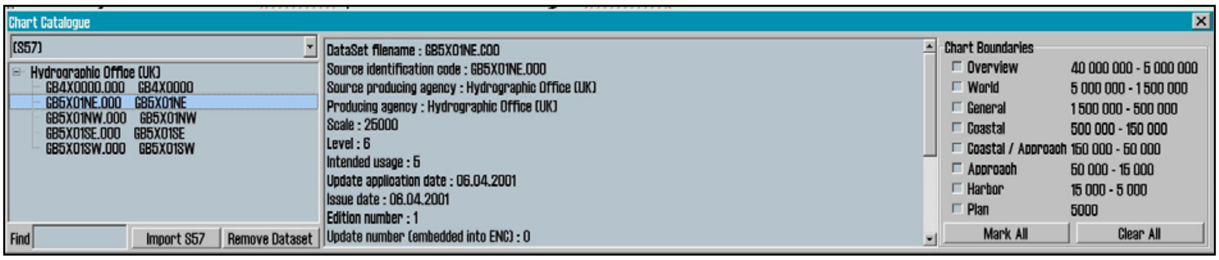
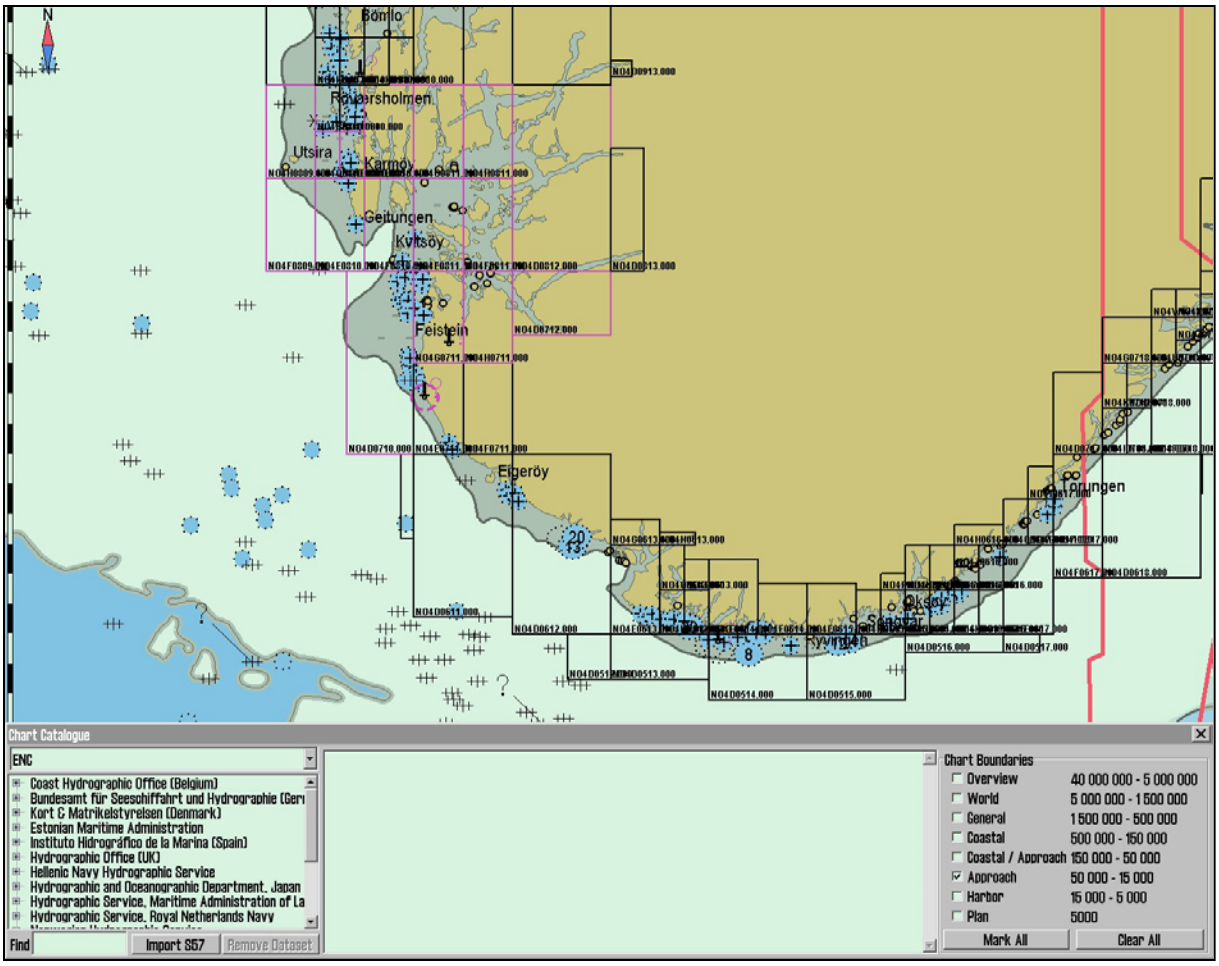


Chart boundaries: graphically presents coverage of all charts in the database at present level. (Levels comply with scale selected on the top menu bar) Licensed charts are displayed with magenta, non licensed charts are marked with black boundary. Chart names are presented in the bottom left hand corner of the square.



Remove dataset: If a database contains imported S57 data is selected in the drop down menu, the button" Remove Dataset" will delete selected chart.



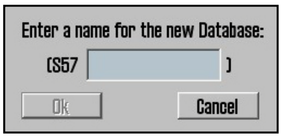
4.4 Import of S57 data

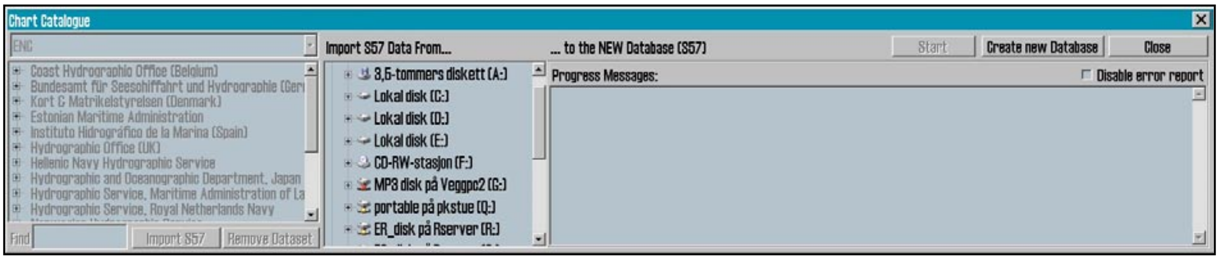
NB: When two ECDIS machines are connected, make sure to make the same updates in the second ECDIS.

Import of S57 data is done trough the chart library. Select database in the drop down menu and press "Import S57".

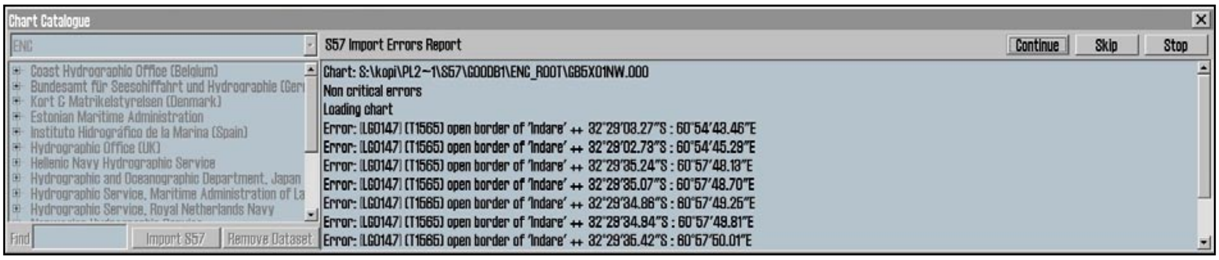
A database contains of datasets (charts). ENC data is sold as ENC cells in S57 format. Trough import to a database every ENC cell is converted to a dataset. This is a two step process: verification of data and conversion/compilation to a dataset.

To import data, select drive in the field "*Import S57 data from…*". Data is imported to a database which name beginns with S57. However there are none S57 databases present, a new one (S57) is created. Optional an own database can be created by pressing "create new database". S57 database is added automatically and can be highlighted for viewing in setup menu folder.





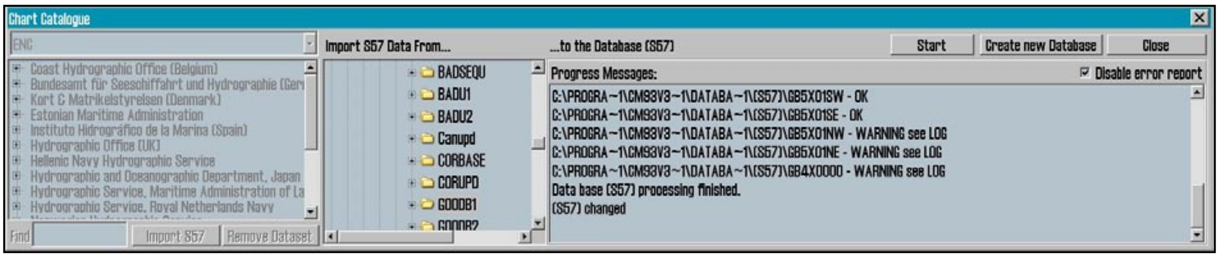
When drive is selected,the "start" button is activated. Press the button to commence import. Data is automatically veryfied.



If errors are discovered a ”**S57 Import ERROR report**” is shown. The error report contains name of import file and wheater the error are critical or non-critical. Files including critical errors are not imported. If non-critical errors occurs, files can be imported or excluded by pressing ”continue” or skip. If “stop” is pressed the import process is terminated.

Disable error report: If this option is selected prior to dataimport, the process will run automatically. S57 importfiles including critical errors will be excluded and files with non-critical errors are imported.

NB: When using ”disable error report”, it is impossible to view detailed information about the data import. Also errors reasoning ENC cells not to be imported due to critical errors, are not displayed.



A import log vil be created. This log can be viewed selecting actual dataset in the chart library, by scrolling down to S57 importlog in the information field. If import of chart corrections are done in S57 format, those can be viewed in C-Map chart update.

By pressing the right mouse button in the message field, log files with information/history about file verifying and compilation are displayed. This is a overview, not a detailed report/log (not displaying any deleted datasets).

Chapter 5: Miscellaneous

5.1 Error Messages

TECDIS includes automatic error detection in most functions. If it is possible, corrective measures will be taken without requiring operator intervention. In case of critical errors, the operator is notified. In addition to the possible error situations listed here, both the Windows operating system and support routines may in some instances display error messages not listed. Common to these error messages is that corrective measures (if possible) are initiated by restarting the ECDIS. In the case of a system failure any error messages should therefore be noted. If the ECDIS is not responding or appear to be malfunctioning, try restarting the ECDIS. If this does not correct the error situation, notify your support contact.

10=Init required too much space	Memory full or error. Try restarting ECDIS.
11=Bad init parameters	System error, should not normally occur.
12=Data files not found	Old data file has been erased or destroyed. New (empty) data file is automatically generated.
13=Open db can not determine type of file	Installation error, use of invalid data.
14=Data files appear to be corrupted	Try restarting ECDIS to generate new data file.
16=Could not create index file	Hard drive error or full, try erasing old data.
17=Could not create data file	Hard drive error or full, try erasing old data.
18=Tried to create existing index file	System error, should not normally occur.
19=Tried to create existing data file	System error, should not normally occur.
24=Could not close file	System error, probably memory error.
46=File number already in use	System error, should not normally occur.
47=c-tree has not been initialized	System error, should not normally occur.
101=C-Map system files not installed	Incorrect or incomplete installation.
102=No C-Map charts installed!	Incorrect or incomplete installation.
103=No chart database set as default!	Incorrect or incomplete installation.
104=g_manager->Init() failed	System error, should not normally occur.
105=g_map->Init() failed	System error, should not normally occur.
106=g_mini->Init() failed	System error, should not normally occur.
107=Update successfully completed	Update confirmation.
108=g_map->SetZoom() failed	System error, should not normally occur.
109=g_map->SetScale() failed	System error, should not normally occur.
110=g_mini->SetScale() failed	System error, should not normally occur.
111=g_map->SetRotation() failed	System error, should not normally occur.
112=g_mini->SetRotation() failed	System error, should not normally occur.
113=g_map->AddBase() failed	System error, should not normally occur.
177=Not TECDIS dongle	License dongle found but not approved.
188=Error in periodic ID check	No license dongle found or approved.
189=File read failed	Error in license dongle.

190=Read of file length failed	Error in license dongle.
191=File number out of bounds	Error in license dongle.
192=Cmap init error	License dongle not C-Map approved.
193=Init has not been called	Error in communication with license dongle.
194=Error parsing system ID	Error in communication with license dongle.
195=Cmap registry error	Error in communication with license dongle.
196=Dongle is not Telko dongle	License dongle not approved.
197=No eToken dongle present	No license dongle found.
198=Cmap init error	Error in license dongle.
199=Init has not been called	Error in communication with license dongle.
200=Unknown error	Important! With errors relating to license dongle, try removing then reinserting the license dongle, or try moving it to another USB port. Then try restarting the ECDIS.

5.2. Monitor Calibration

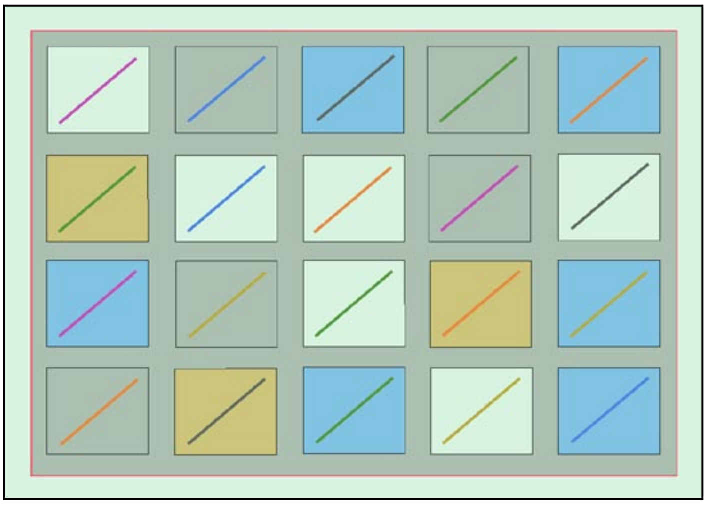
All information in electronic chart displays must be highly visible. To ensure this monitor must be calibrated to display correct colors. This is very important, specially for night palettes, when monitor is dimmed.

ECDIS colortest for monitor calibration is also placed in IHO presentation library. Open library by pressing Control + alt + shift + T, and select test diagram by pressing A – B – C- D- E eller T on the keyboard.



Brightness check: Open test diagram E and verify that the grey box is clearly visible.

Check colors: Open test diagram T. All diagonal lines to clearly separate from background:



- 3 Yellow diagonal lines
- 4 orange diagonal lines
- 3 magenta diagonal lines
- 4 green diagonal lines
- 3 blue diagonal lines
- 3 grey diagonal lines

Check visibility of each color in the diagrams (A-E). If the monitor fails the test, it no longer meets the minimum requirements for display performance. It should be evaluated by a qualified engineer and be repaired or replaced as necessary.

This test must be performed with all color palettes on the system (day/dusk/night).

NB. If monitor settings has been changed manually in the monitor menu, or to make sure correct settings are used, go to ”setup” menufolder, press ”Auxilary” and select ”recalibrate screen”

Chapter 6: Checklist regarding installation

6.1 Checklists prior to completion of TECDIS installation.

Item:	Task to be performed:	OK:	Comments
1	Verify that all selected ports are receiving/transmitting data, and that ports have been given names on both main and back-up TECDIS. Names shall be according to the data they are receiving/transmitting.		
2	Verify that sensor data is correctly distributed between main and back-up TECDIS (NMEA server program).		
3	Verify that one single action do not result in loss of position on both main and back-up TECDIS.		
4	Verify that main and back-up TECDIS and respective equipment are connected to a proper UPS.		
5	Verify that boat size are correct compared to chart on both main and back-up TECDIS.		
6	Perform monitor color calibration on main and back-up TECDIS.		
7	Verify that alarm function on both main and back-up TECDIS is working properly.		
8	Check that TECDIS transmits alarm to external systems.		
9	If installed, verify generation of conning picture and correct display of sensor data on conning monitor (check against engine telegraph, speed repeaters, gyro repeaters etc)		
10	Verify audible signal from alarm speaker on TECDIS		
11	Verify sensor data (correct size of vessel etc) is filled in on main and back-up TECDIS.		
12	Verify that back-up of default setup values have been performed (save setup default values) on main and back-up TECDIS.		
13	Verify that installed charts have been correctly installed on both main and backup TECDIS (if installed), and that charts license matches.		
14	Unplug TECDIS USB-key, restart TECDIS to verify it starts up in normal mode (chart program starts automatically) and boat symbol and sensor data are displayed.		
15	Fill in hardware/software fact sheet and file it in ships documents and in technician personal files.		

Item:	Hardware	Model/type:	Serial no.
1	Keyboard Main		
2	Keyboard Back-up		
3	Processor Main		
4	Processor Back-up		
5	Telchart alarm interface		
6	Trackball Main		
7	Trackball Back-up		
8	Analog signal collector		
9	Monitor Main		
10	Monitor Back-up		
11	Conning monitor		
12	Alarm loudspeaker		
13	MOXA interface		
14	Additional units		
15	Additional units		
16	Additional units		

Item:	Software	Version:	Description:
1	TECDIS Main		
2	TECDIS Back-up		
3	C-Map SDK Main		
4	C-MAP SDK Back-up		
5	Additional software		
6	Additional software		
7	Additional software		

Item:	License	Number:	Description:
1	TECDIS license # Main		
2	TECDIS license # Back-up		

NB: License for charts is not possible to list, as there is one license per chart.

6.2 Checklists prior to completion of TECDIS TC and TECDIS AW installation.

If installation includes Track Control functionality, the following tests must be performed.

TECDIS 1 and 2

No.	Function	Requirement	Results
Harbour Acceptance Test (15 minutes)			
1	External data	Go to setup menu and verify NMEA inputs are valid. Check input values for position and course.	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A
2	External data	Verify that TECDIS receives valid sensor data from a minimum of: • Two independent positioning sensors • Two independent heading sensors • A speed sensor	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A
3	Alarm system	Verify that TECDIS is connected to a separate alarm system.	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A
4	System status	Check that no alarms/warnings are pending in alarm window.	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A
5	Chart database	1,Select setup menu, chart utilities, chart licenses 2,Verify that licences are valid for intended voyage 3,Click C-Map chart update 4,Verify that charts are updated in update log	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A
Sea Trial Test (15 minutes)			
6	AIS and ARPA Targets (If present)	1,Activate ARPA on radar and select a target. 2,Click the symbol button of [ARPA Targets]. 3,Click the symbol button of [AIS Targets]. AIS and ARPA Targets are displayed on the top of charts.	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A
7	Conning display (If present)	Correct indication is shown at the each configured window on the Conning Display. Verify that selected sensors used by heading, position is correctly indicated.	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A

8	Route Monitoring	Before start TEST, routes must be created or transferred from other TECDIS: 1,Press the [Plan] key, icon with number 1 indicated is active. This means primary route will be selected. Choose a route with boathook icon. 2,Press [YES] icon to activate route. 3,Route is then shown on displayed charts. 4,To display secondary route choose icon with button 2 indicated. Repeat procedure as for primary route. 5 To exchange primary and secondary route, press icon with 1↔2 indicated. 6. Observe that correct warings is activated as appropriate. 7. Click alarm icon for display of alarms and warnings on route. 8. Test that activating tracksteering is successful.	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A
9	Radar overlay (If present)	Check that radar overlay from radar is displayed on display after pressing radar overlay icon.	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A
10	Aids to navigation	Verify that TECDIS handle different functions like; 1. Disconnect position sensors and observe dead reckoning performance, verify that alarm is given: pos sensor ½ lost. 2. Activate track dialog and set past tracks visible by clicking on “show” icon. 3. Enter manual fix, by activating “bearing” icon. Click on center button on mouse when mouse is in position of visual object. Use observed gyro bearing to make a red line in chart towards estimated position. Repeat procedure to make two lines resulting in a cross bearing. 4. Update charts, enter chart utilities menu, choose C-Map charts update. Use semi-auto update. Create a update request file on memory stick. Send file to updates@c-map.no and load received file into TECDIS. Update loaded successfully shall be presented when update Is completed. 5. Activate a route in route menu. To alter at route underway, click on “Edit” icon in route menu. Modify route and click on “OK” icon. Route is now altered. When at track steering mode, 3 waypoints are not allowed to alter, last waypoint, next waypoint and waypoint after next. 6. Manual adjustment for position is available in setup menu, click on “nav. position offset” icon and a dialog box appear in top right corner of map. Enter offset values as appropriate.	TECDIS 1: □Good □NG □N/A TECDIS 2: □Good □NG □N/A

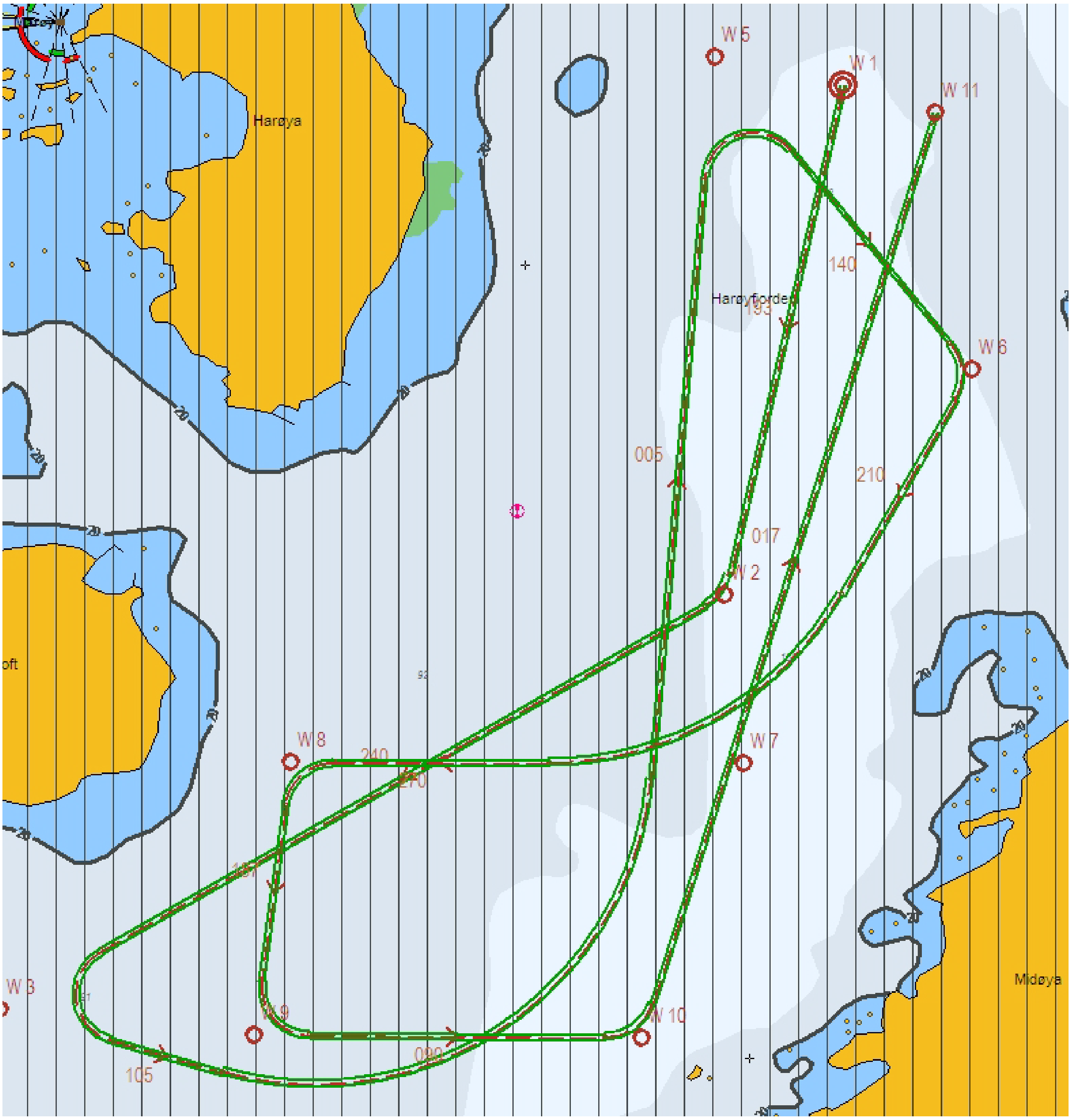
Anschütz NP 2025 PLUS Adaptive Autopilot

No.	Function	Requirement	Results
Harbour Acceptance Test (15 minutes)			
1	External data	Correct number is shown at each box of below. “Heading”, “Speed”	□Good □NG □N/A
2	Heading Control	1,[HEADING CONTROL] is activated when steering mode switch is set to “auto”. Present heading is displayed in heading display and in preset heading display. Present heading is activated as set heading. 2. Verify parameter settings for rudder, yawing, counter rudder, rudder limit, ROT limit and radius value. Verify mode of heading change, radius or R.O.T. mode by observing key lamp. 3. Alter set course by either turn knob and push set button to acknowledge or push and turn knob. Observe correct rudder response. 4. Observe rudder movement. 5. Observe that max rudder limit is not exceeded.	□Good □NG □N/A
3	Steering Control	1,Rudder moves to 10 degrees PORT when SET HEADING is set by 20 degrees below Gyro heading. 2,Confirm the actual rudder angle by rudder angle indicator.	□Good □NG □N/A
4	Function	1. Change operating mode from hand to heading control at Track Control TECDIS , verify that correct mode is indicated on TECDIS and conning monitor also. 2. Shift from heading control to manual mode by switching steering mode selector. Verify that change to manual mode is possible from all modes with a single operator action.	□Good □NG □N/A
5	Function	1. Change set course 50 deg to starboard, off-heading alarm not to be activated during setting of new course. Alarm is de-activated for a time period that is a function of present course and new desired course.	□Good □NG □N/A
6	Function	Test override tiller in modes: hand, heading control and track control. Autopilot to go to hand	□Good □NG □N/A
Sea trial test (240 minutes)			
1	Heading Control	Response and stability of "Heading Control” steering. 1,Observed overshooting should max 2 deg on 10 deg course change and max 5 deg on 60 deg course change. 2,Repeat another side course change with same value. Starboard 10 deg turn with NAV FULL speed (If available). Port 10 deg turn with NAV FULL speed (If available). Starboard 60 deg turn with NAV FULL speed. Port 60 deg turn with NAV FULL speed. Tests to be repeated with half speed ahead.	□Good □NG □N/A
2	EMC	Testing of interference of radio transmissions while in heading control, observe system while: 1. Transmitting a call with FS-2570 2. Transmitting a call with VHF’s 3. Transmitting a message with Felcom-15 1&2 4. Transmitting a call with Felcom-70	□Good □NG □N/A
2	Track Control Steering	Steering function test should be performed as follow in the next lists "**Track Control Test** " and **“Fail to Safe Properties”**	□Good □NG □N/A

Track Control System Test
Items to be checked during sea trial

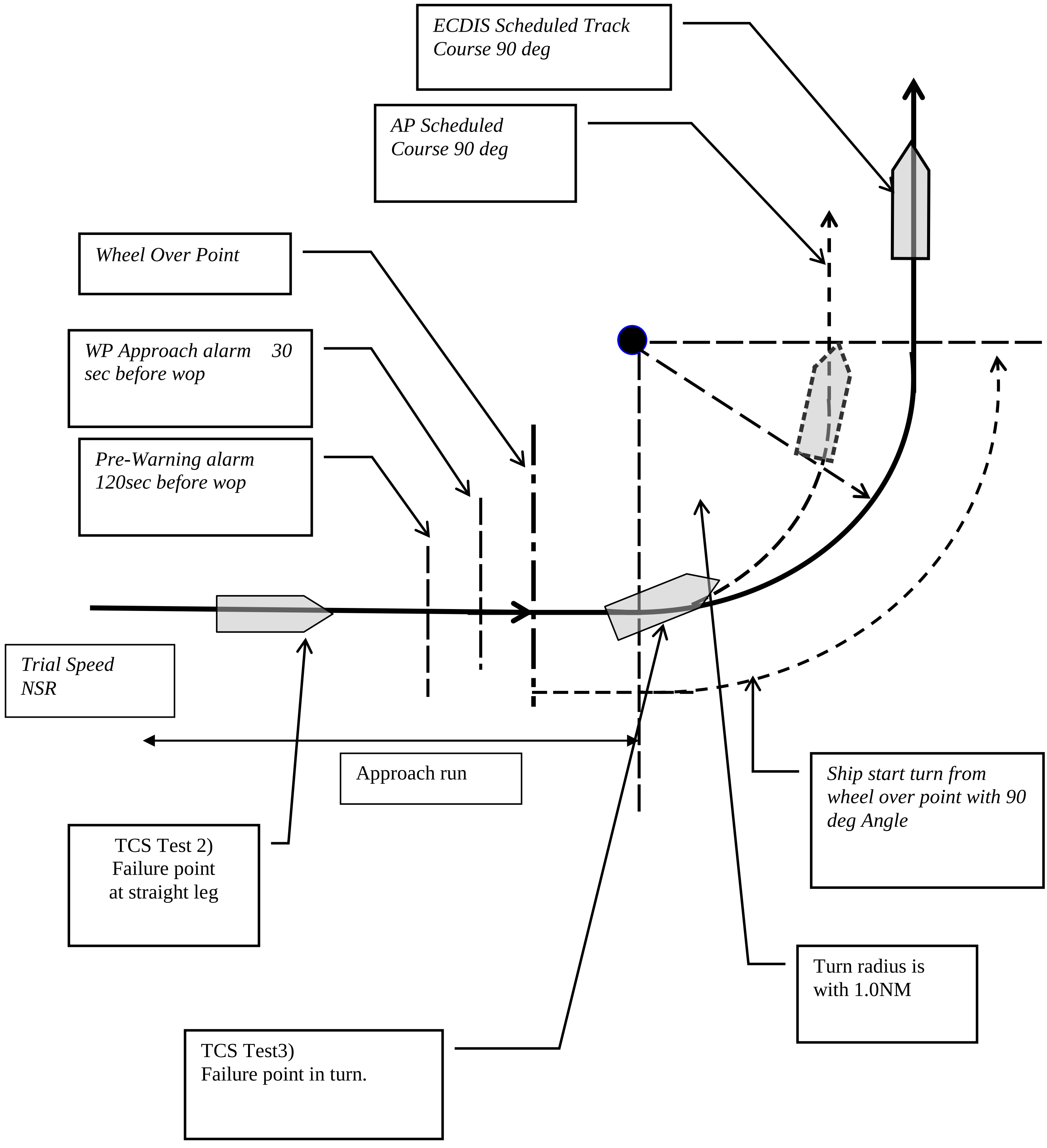
No.	Item	Content	Result	Remarks
1		The following units have to be tested prior to the Track Control test: ECDIS AUTOPILOT STEERING GEAR		
2	Route	Create a test route for Track Control in keeping with the vessel maneuverability as per shown example attached (or import by file).		
3	Route monitoring	1. Enter route menu, check that icon "1" is activated (primary route). Use boathook to select route from previous test item. Click yes when asked to activate route. 2. Check that route monitoring parameters are shown in right menu (XTE, next waypoint info etc.)		
4	Track keeping	1. Check that ship follows the test route selected on ECDIS. *Recommend test speed is normal sea speed 2. Check performance according item 1 with speed reduction applied in one turn. 3. Check performance according item 1 with inducing current effect by using bow thruster during turn.		
5	Alarms	1. Set WP pre-warning and WP approach time on the ECDIS as per drawing below. Verify that WP approach Alarm is generated when the ship approaches the WP. 2. Verify that separate Alarm system activates back-up navigator alarm when WP pre-warning and WP alarm on ECDIS is not acknowledged. 3. Set alarm for gyro mis-match to minimum in TECDIS Setup program. Wait for alarm to be raised. 4. Activate route and use "Heading Control" mode on autopilot. Steer outside channel limit to generate XTE alarm. 5. Set "Heading off" alarm low and use bow thruster to provoke a heading drift. Verify that alarm is raised.		

Example of route for Track Control testing



WPT 3: 135 deg turn port, WPT 5: 135 deg turn starboard (both with minimum radius*)
WPT 4: 60 deg turn port, WPT 7: 60 deg turn starboard (both with 2 NM radius)

* Minimum radius to be settled after calculations from yard.


ECDIS Scheduled Track
Course 90 deg
AP Scheduled
Course 90 deg
Wheel Over Point
WP Approach alarm 30 sec before wop
Pre-Warning alarm
120sec before wop
Trial Speed
NSR
Approach run
Ship start turn from wheel over point with 90 deg Angle
TCS Test 2)
Failure point
at straight leg
Turn radius is
with 1.0NM
TCS Test3)
Failure point in turn.

Fail to Safe Properties

Item	Fail	Track Control (TCS)	Test	Result
1	Position sensor antennas to be blinded off.	When either of position sensor acquisition stops, TCS emits alarm but continues to function utilizing acquired position from other position sensor, LOG, and GYRO. When both position sensor acquisition stops, TCS emits alarm but begins navigation utilizing estimated position made available by LOG and GYRO. Then it (after 10min) automatically switches to Radius mode and manual maneuver will be in effect.	Remove No.1 position sensor antenna Remove No.2 position sensor antenna	
2	Disconnect position sensor on a straight leg.	Same as above	Remove No.1/2 position sensor	
3	Disconnect position sensor during max radius turn.	Alarm will be emitted only from ECDIS which places no influence on TCS function.	Remove No.1 position sensor output connector during maximum radius turn.	
4	Turn Heading Control System rudder limit to min value during min radius turn.	Not available.	Adjustment of rudder limit is not available.	
5	Disconnect serial link to heading controller during straight leg.	Emits alarm and stops TCS function simultaneously. It automatically switches to Radius mode and manual maneuver will be in effect.	Remove Track Control connection from ECDIS while sailing straight ahead.	
6	Disconnect serial link to heading controller during turn.	Emits alarm and stops TCS function simultaneously. Automatically switches to Radius mode and manual maneuver will be in effect after turning to the pre-determined maximum degree.	Remove signal cable exclusively in use for Auto Pilot outputted from ECDIS while turning.	
7	Disconnect speed log during straight leg/ or turn.	Although emits alarm, two position sensor data inputted maintains the normal function.	Remove LOG input outputted to ECDIS while turning.	
8	Simulate failure in ECDIS.	Same as item 5 or 6.	Turn off ECDIS	
9	Simulate failure in conning display.	Not influential	Turn off Conning Display	
10	Disconnect rudder feedback.	Emits alarm by Alarm System. If the deviation between order rudder angle and actual rudder angle is 5deg or more, the Alarm System emits alarm and freezes the actual rudder angle at this time.	Remove rudder feedback input outputted to Alarm System while turning. **<u>* This test is dangerous !</u>**	
11	Simulate failure in Autopilot	Emits alarm by Alarm System and stops TCS function. Rudder angle is frozen at this time.	Remove power connection to autopilot while turning. **<u>* This test is dangerous !</u>**	
12	Simulate failure in No.1 gyro.	Not influential	Switches automatically from No.1 to No.2	
13	Check that second gyro is automatic applied in case of failure in the active gyro.	Not influential		

6.3 Additional checklist prior to completion of TECDIS AW installation

No.	Item	Content	Result	Remarks
1	Conning	Verify that when one of the ECDIS processors lose sensor data on one serial line, display of sensor data (relevant according to failed serial line) on conning monitor is not affected.		
2	General	Verify that installation is done according to block diagram for TECDIS AW system.		
3	General	Verify that installation is done according to functional description given for TECDIS AW system.		
4	General	Verify that required conning info according to NAUT AW requirements are displayed correctly.		
5	Gyro	Verify that requirements set forth in section 1.7 are fulfilled.		

6.4 Installation Notes

6.5 Track-record of performed installation

Name of vessel:	
Date of installation:	
Name of technician:	

Checklist performed:	

During all installations this checklist shall be filled in, this is for verifying a proper installation of the ECDIS system onboard.

Revision History

Revision 1.0 (13.05.2005)
- Initial revision

Revision 1.1 (17.06.2005)
- Illustrations updated
- Wiring and signaling diagrams added
- Hardware installation for auxiliary components added
- Some updates to setup software description

Revision 1.2 (29.08.2005)
- Equipment list updated
- Compass safe distance instructions added

Revision 1.3 (05.01.2006)
- Updated chapter 3.4, size and sensors. New choices: “backward (gyro-180º)” and “Raise alarm if HDT1-HDT2 > 2.5º”
- Updated illustrations in chapter 4.1.

Revision 1.4 (04.08.2006)
- Chapter 3.2.1: Updated text. Port collision warning (case 69, 19.04.06)
- Chapter 3.4: Updated text and illustrations. New function: shiphandle mode (case 53, 30.03.06)
- Chapter 4.1: New function: time zone selection (case 98, 22.05.06)

Revision 1.5 (22.10.2006)
- Chapter 3.2: Updated illustration
- Chapter 3.2.6: Added description of RCU-018 ctrl field.
- Chapter 3.4: Updated illustration
- Chapter 3.5: Updated illustration
- Chapter 3.6: Updated illustration
- New Chapter 3.7 (Track Control)
- Compass Safe Distance table on page 1 updated
- Equipment Lists on page 5 updated
- Installation Overview illustration updated
- Specifications updated
- Updated mounting section
- Added mounting Chapter 1.3 Control Unit Furuno RCU-018
- Added Chapter 2.1, HT405P4 Wiring diagram
- Added Chapter 2.3, Processor connectors, HT405P4 TEL-A1
- Renumbered chapters following 2.1

Revision 1.6 (30.04.2007)
- Compass Safe Distances on page 1 updated
- Equipment List on page 5 updated
- Installation Overview illustration updated
- Specifications for HT 405P4 on page 7 updated

- Specifications for JH 23T02 on page 8 added
- Mounting dimensions for JH23T02 added to chapter 1.1 (page 17 and 18)
- New chapter: 1.6 Track Control: Anschütz NP 2025 PLUS

Revision 1.7 (17.10.2007)

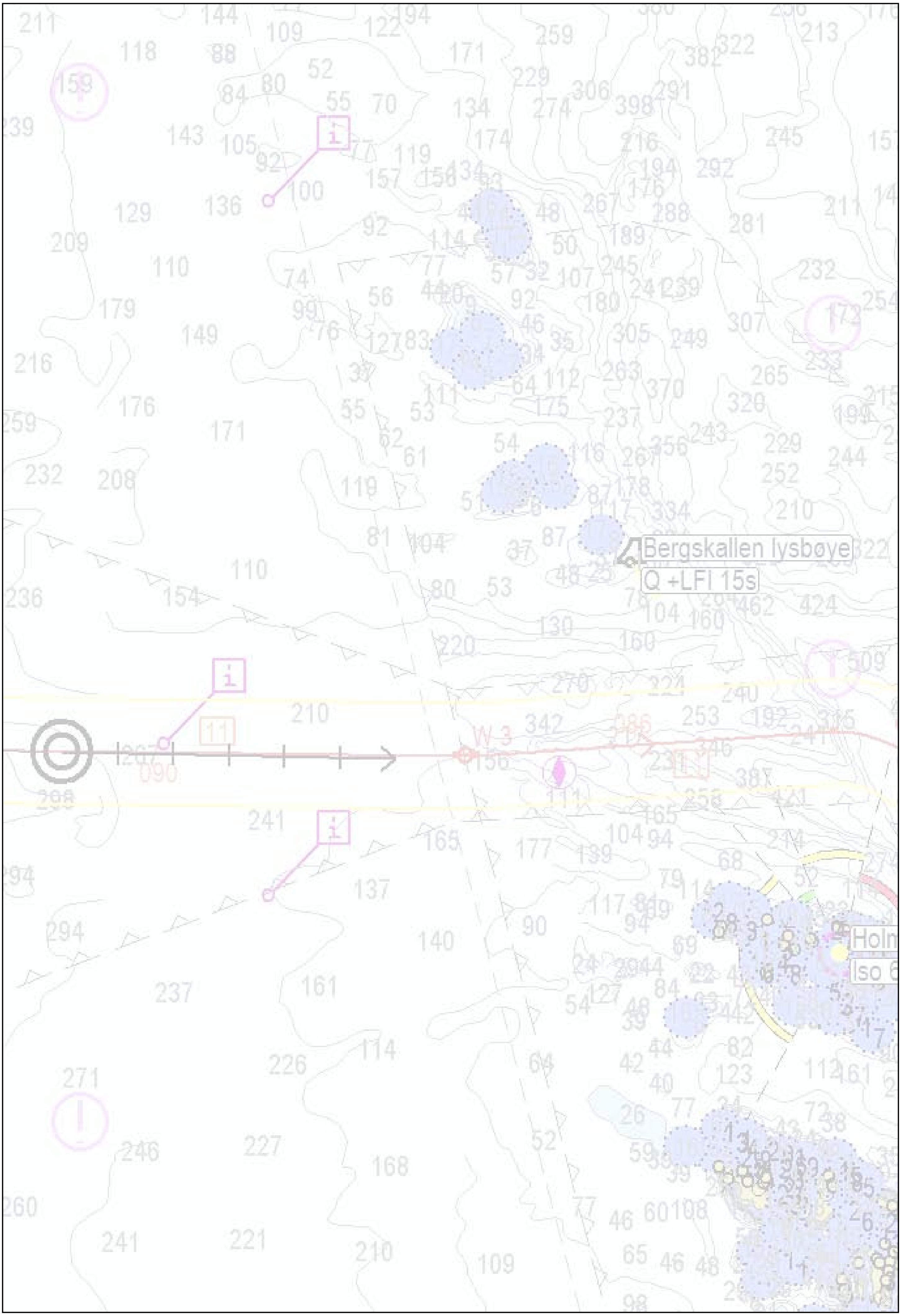
- Section 2.5 Processor connectors, HT405P4 TEL-A1 on page 37 updated with information about ferrite placement.
- Section 3.2. NMEA data setup on page 41-44 updated with new illustration and information about status color coding.
- Section 3.5.1 Install, update or remove chart databases on page 49-50 updated with information about new function 'Remove Licenses'.

Revision 1.8 (15.11.2007)

- General introduction to the installation manual updated with new configuration data file.
- Section 1.6 updated with minimum sensor and other connection requirements for Track Control functionality, and requirements to ensure "freeze rudder" functionality.
- Section 6: Added checklists for Track Control system and installation notes

Revision 1.9 (16.04.2008)

- Changed heading for section 6.2 to include TECDIS AW
- Added new section 6.3 for additional TECDIS AW requirements checklist
- Old section 6.3 and 6.4 are now section 6.4 and 6.5
- New section 1.7 for NAUT AW gyro sensor input requirements


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